User Manual

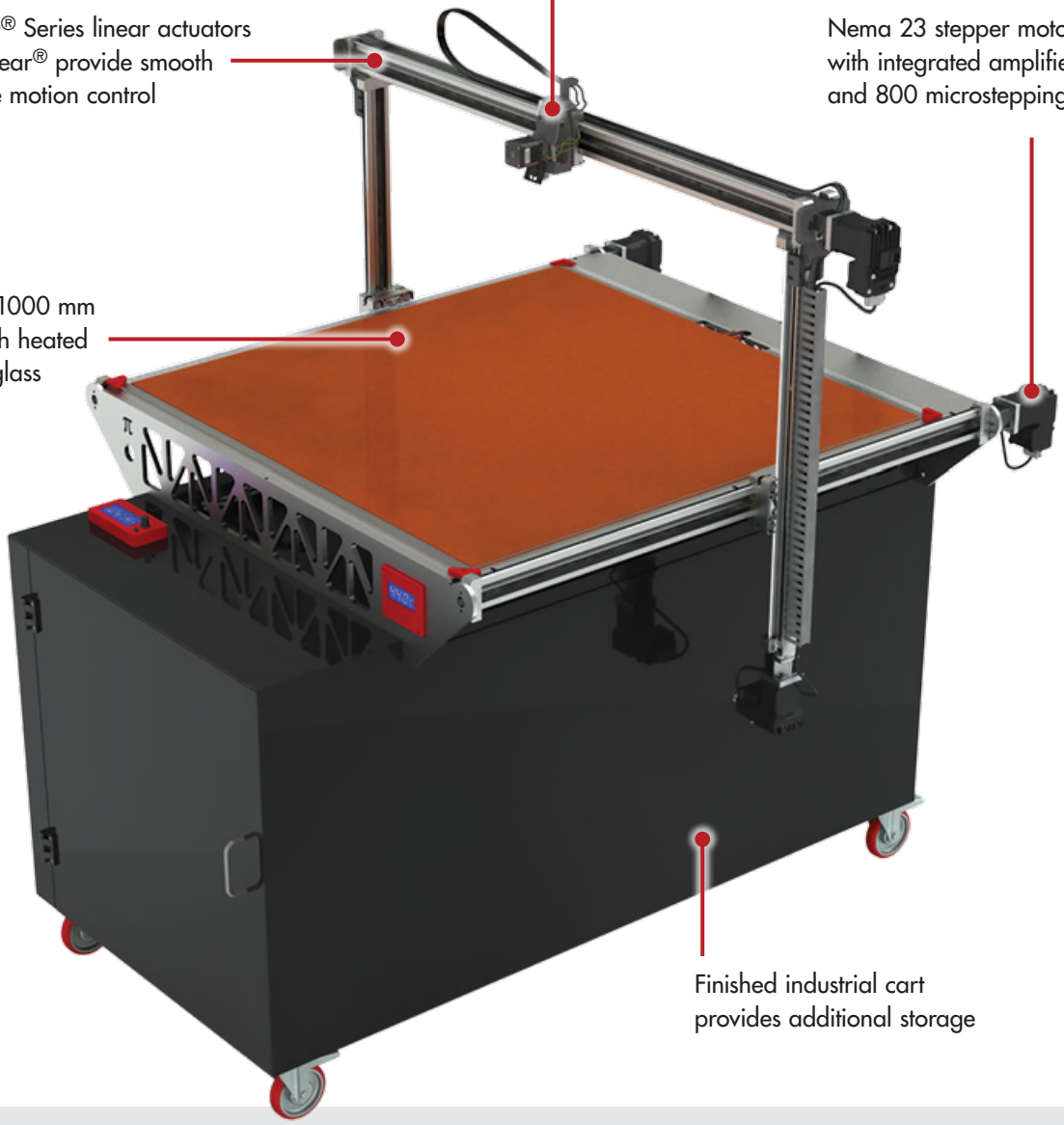
3DP1000

www.3DPunlimited.com

About the *3DP1000*

Watch the video: Why Large Format 3D Printing?

Tools Required
- Phillips Head Screwdriver
- 3 mm Allen Wrench or Hex Key


Single or dual extruder options are available
Robust SIMO® Series linear actuators from PBC Linear® provide smooth and accurate motion control
Nema 23 stepper motors with integrated amplifier and 800 microstepping
1000 mm x 1000 mm print bed with heated borosilicate glass
Finished industrial cart provides additional storage

WHO IS 3DP UNLIMITED?

3DP Unlimited™, a division of ***PBC Linear***®, is a company of skilled mechatronics engineers who embrace rapid advances in technology to innovate, design, and build next generation equipment for additive manufacturing. Having personal experience with inconsistent results produced by traditional 3D printer designs, ***3DP Unlimited*** is committed to building on industrial strength linear motion components, actuators, and motors while maintaining affordable flexibility with open source control solutions.

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Introduction | 3DP1000

SPECIFICATIONS

Printer Type: FFF – Fused filament fabrication is an additive manufacturing technology commonly used for modeling, rapid prototyping, and production applications.

Build Area: 1 meter x 1 meter x 0.5 meter (39.3" x 39.3" x 19.6")

Layer Resolution: Down to 70 microns (0.0027")

Note: Accuracy is dependent upon slice settings, geometry, print speed, filament quality, and a range of other factors. Under average conditions, it is typical to hold layer resolution of 100 microns with a well-tuned and calibrated printer configuration.

Filament Diameter: 3 mm (0.118")

Nozzle Diameter: 0.4 mm (0.015")

Connectivity to Laptop: USB

***Non-Standard Options:** Consult factory for non-standard options such as dual extruder, enclosure system, and other special requirements.

PHYSICAL DIMENSIONS & WEIGHT

Overall Width: 1.422 meters (56")

Overall Depth: 1.676 meters (66")

Overall Height: 1.524 meters (60")

Approx. System Weight: 400 lbs.

Shipping Crate Dimensions:
1.524 m x 1.828 m (5 ft x 6 ft)

Approx. Shipping Weight: 1200 lbs. (includes crate)

TEMPERATURE

Ambient Operating Temperature Needed:
15° - 32°C (60° - 90°F)

ELECTRICAL

AC Input: Option 1: 110 V, 15 Amp, 60 Hz
Option 2: 220 V, 13.6 Amp, 60 Hz

MECHANICAL

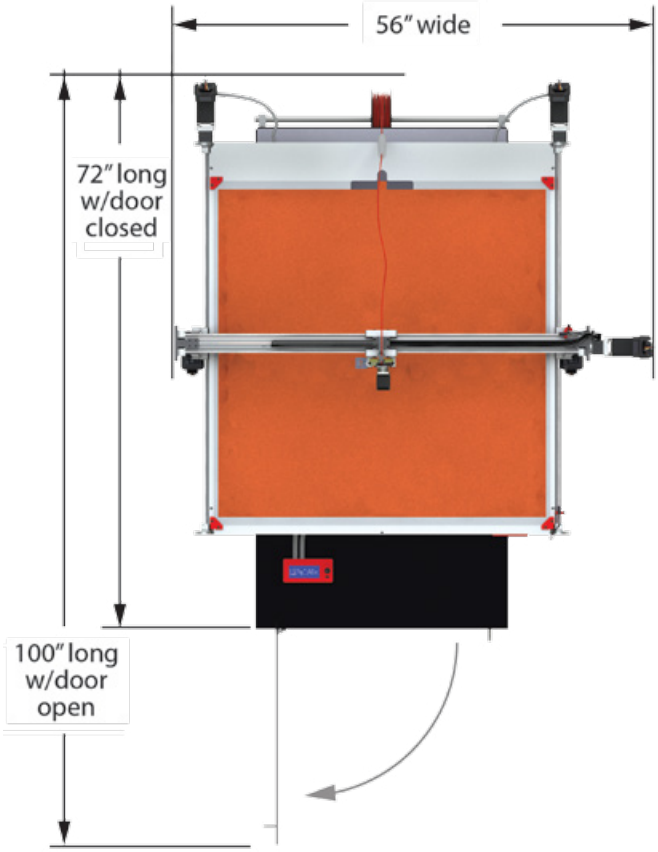
Build Platform: Heated borosilicate glass, 5 mm thick

XYZ Axes: Lead screw driven SIMO® Series linear actuators from PBC Linear®. Screw max values: 640 RPM, 16000 mm/min, 267 mm/sec.

Stepper Motors: Nema 23 stepper motors from Applied Motion Products with integrated amplifier and 800 micro-stepping (as set at factory). M/S option up to 25000 available.

CLEARANCE DIMENSIONS

Overhead view shows the necessary clearance.



RECOMMENDED SOFTWARE

- **Repetier Host & Slic3r**
  www.repetier.com; www.slic3r.org
  Open source, no cost

or

- **Simplify 3D**
  www.simplify3d.com
  Available for purchase

Note: Repetier Host and Slic3r are used in conjunction and can be downloaded simultaneously from the Repetier Host website. Simplify 3D is used singularly to manipulate files and operate the printer.

MATERIAL OPTIONS

Material Compatibility: The 3DP1000 printer is capable of printing materials which are created for Fused Filament Fabrication (FFF), including but not limited to PLA (Polylactic Acid), ABS (Acrylonitrile Butadiene Styrene), PC (Polycarbonate), Nylon, Ninja Flex, PVA (Polyvinyl Alcohol) and HIPS (High Impact Polystyrene).

Note: Some materials may require increased bed and nozzle temperatures, as well as additional ventilation.

Watch the video: What Materials Can Print on a 3DP1000

Suggested nozzle and bed temperatures–page 17

FEATURES & BENEFITS

Large Format: The *3DP1000* printer utilizes the durable SIMO® Series linear actuators from PBC Linear® for robust and accurate mechatronics while creating a huge workable print area of 1.0 meter x 1.0 meter x 0.5 meter (39" x 39" x 19"). In fact the print area is 74 times larger than the average desktop 3D printer.*

Precision: SIMO Series linear actuators and Constant Force™ lead screws from PBC Linear enable repeatable accuracy over the life of the system – resulting in print layer resolutions as fine as 70 microns.

Advantages:

- Print 1-to-1 scale prototypes and models on the large 1.0 m x 1.0 m x 0.5 m workable build area.
- Rapid prototyping is reality – design and test models before mass production of engineered parts.
- Print multiple production parts in one build.
- Utilize the printer for smaller intricate parts that require high print resolution.

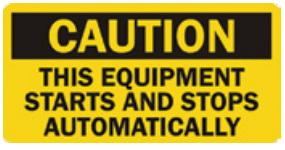
Open Source: The term, *Open Source*, most commonly refers to a computer program in which the source code is available to the public for use and can be modified from its original design. The *3DP1000* printer from 3DP Unlimited utilizes open source software and control platforms, providing flexibility to the end user.

* When compared to the average-size desktop 3D printer.

Introduction | 3DP1000

SAFETY GUIDELINES & SYMBOLS

- Follow all safety guidelines when operating the *3DP1000* printer.
- The *3DP1000* printer generates high temperatures in the print nozzle and the print bed – do not touch when hot. Allow the unit to cool before touching.
- Due to high temperature outputs and moving parts, the location where the printer is operating should be equipped with working smoke and flame detection.
- The *3DP1000* printer melts material during printing. Some materials may require ventilation.
- Do not leave the *3DP1000* printer unattended while in operation.
- The *3DP1000* includes linear actuators that move in multiple directions at variant speeds. When in motion, they can cause injury. Keep all items clear of the moving actuators.
- In case of emergency, unplug the unit from the electrical outlet.

	Warning: Hot Surface A hot surface is located in the vicinity – do not touch. The *3DP1000* printer generates high temperatures in the print nozzle and the print bed.
	Caution: Keep Hands Clear Indicates a pinch hazard. The *3DP1000* includes linear actuators that move in multiple directions at variant speeds. When in motion, they can cause injury.
	**Caution: Starts and Stops Automatically** The *3DP1000*'s linear actuators start and stop automatically depending on the printing operation. Always use caution around an operating printer.

USER MANUAL SYMBOLS

Link to product related video

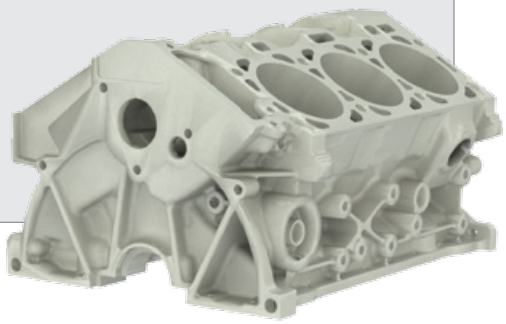
Link to specific product information

Download a file

Typical Workflow for 3D Printing

1. Create or download a 3D model. Save/export the file in .stl or .obj format.
2. Load the file into the 3D printing software of your choice.
3. Determine object parameters: size, quantity, resolution, infill, wall thickness, supports, etc.
4. Slice the file, saving the file as .gcode.
5. Send the .gcode to the printer via computer USB or SD card.
6. Monitor the printer.

Printed Part



LCD SCREEN OPERATION

The *3DP1000* printer can be independently operated through the use of the LCD Screen and the SD Card supplied with the printer.

1. Process a 3D model using the software of your choice on any computer (does not need to be connected to the printer).
2. Output a .gcode and save it to an SD card.
3. Insert the SD card into the card reader located on the side of the LCD screen on the printer.
4. Visit www.3dpunlimited.com for instructions on how to utilize the LCD screen to independently operate your *3DP1000* printer without the connectivity of a computer.

Unpacking

WHAT'S IN THE CRATE

- *3DP1000* Printer with LCD Screen
- *3DP1000* User Manual
- SD Card with Start-Up Configuration and Calibration Files
- Filament Spool Holder
- Filament Guide
- 1 Spool of PLA Filament

UNPACKING THE PRINTER

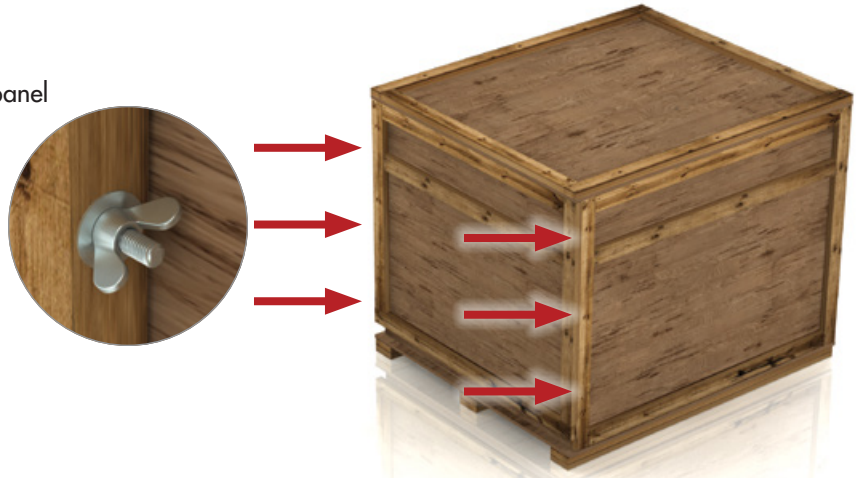
- The *3DP1000* printer will arrive in an industrial strength wood crate. Please take a moment to review the unpacking procedure to ensure the safety of the unpacker, as well as the printer.
- A phillips head screw driver is required for uncrating the printer.

1 OPENING THE CRATE

The crate is equipped with a hinged front panel that is attached by wing nuts and bolts.

Open the crate by unscrewing the six wing nuts from the sides of the front panel. There are three nut and bolt combinations on each side.

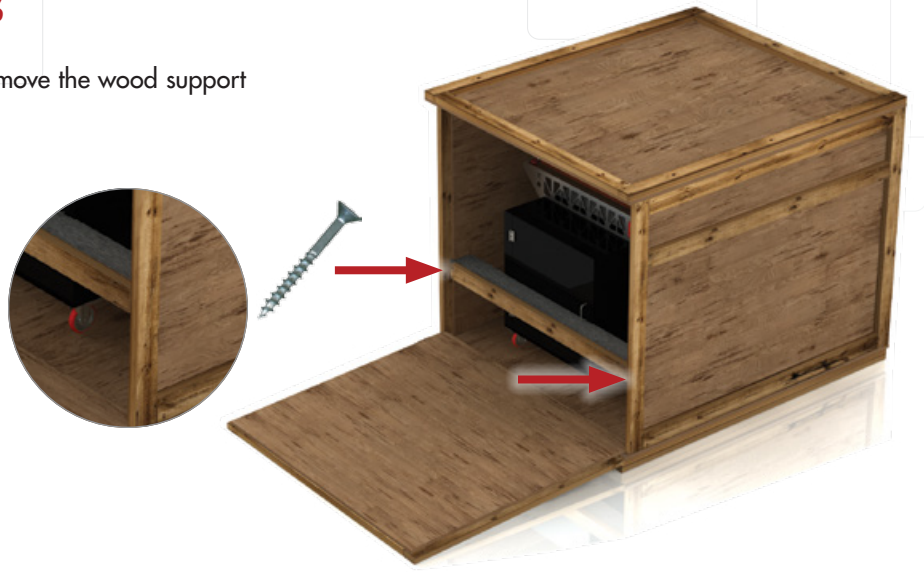
Keep the nuts and bolts in a safe place, to be re-inserted for crate storage after the printer is removed.



Once the bolts are removed, the panel should be safely opened from the top down, with the hinged bottom – creating a ramp for the printer to be easily wheeled out of the crate.

2 RELEASE SUPPORTS

Use a phillips head to unscrew and remove the wood support at the front of the printer.



Tools Required
- Phillips Head Screwdriver

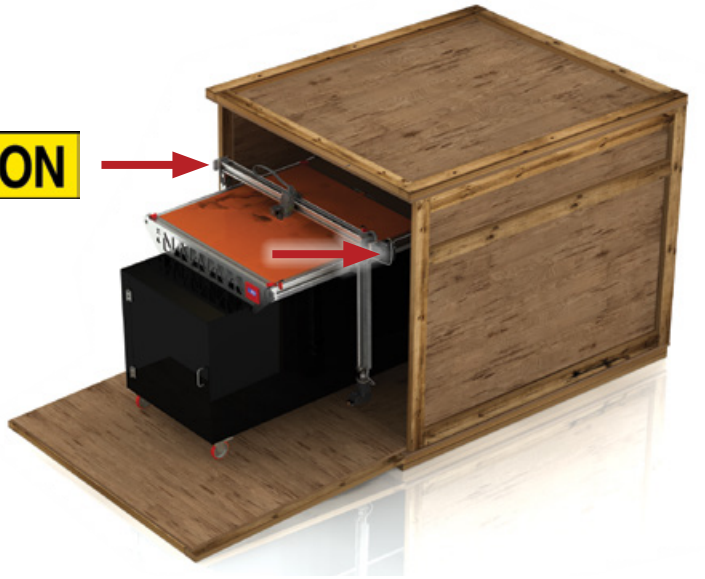
3 ROLL OUT THE PRINTER

The 3DP1000 printer is mounted on an industrial strength cart with wheels, allowing for easy movement.

Use extreme caution. Roll the printer forward and out of the crate.

Avoid contact with the actuators and motors on either side of the printer.

Avoid contact with wiring and the padding on the shipping supports.



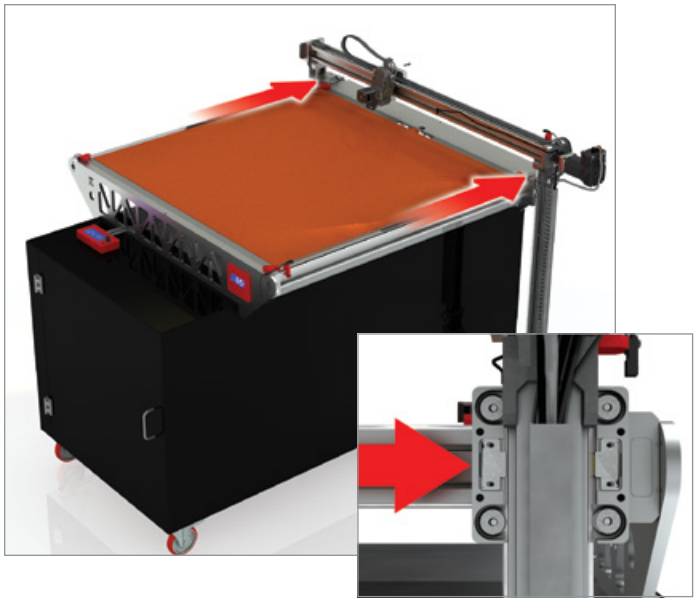
Initial Printer Setup

1 INITIAL ACTUATOR ALIGNMENT

Move the X axis all the way to the end of the build area, as shown. Gently push both sides **simultaneously** so the actuators move smoothly until they reach the end. This will eliminate any racking[1] or misalignment that occurred during shipping.

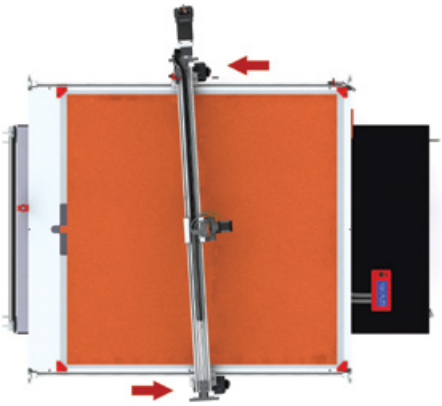
⚠ CAUTION

Initial alignment of the actuators must be completed prior to powering up!



[1]Note: Racking of linear motion actuators can cause serious damage or breakage to mechanical hardware and/or bracketry on the *3DP1000* printer. Follow the *Initial Actuator Alignment* process to reduce the risk of racking.

Example of Racking – To Be Avoided

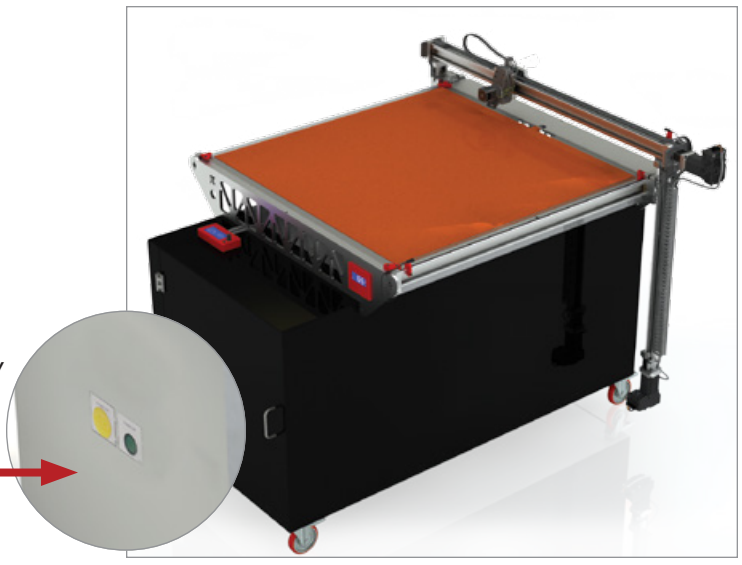


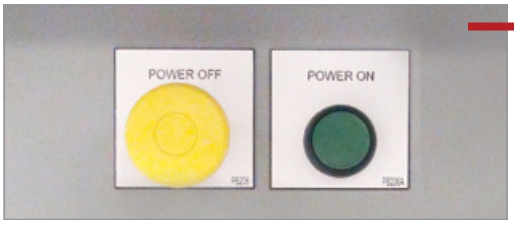
2 POWERING UP

Plug in the power cords for the printer and bed heater. Once the unit is plugged in, turn it on using the (two) switches located on the control panel.

The control panel is located inside the cart toward the front of the printer. If the cart is enclosed, the control panel is located inside of the enclosure toward the front of the printer.

Important: The yellow 'Power Off' knob is the emergency shutoff for the machine. It must be pulled out for the machine to be turned on and will immediately turn the power off when pushed in.





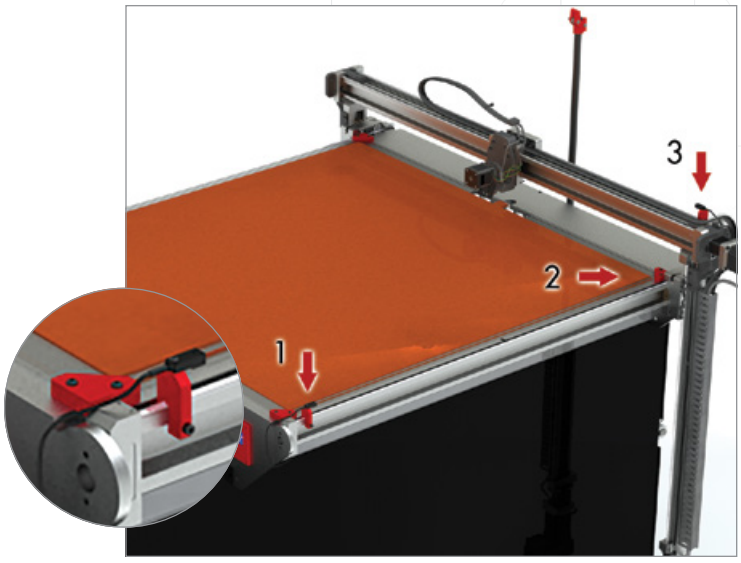
Initial Printer Setup

3 SENSOR VERIFICATION

The *3DP1000* printer has three position sensors–one for the X axis, one for the Y axis, and one for the Z axis. These sensors prevent the extruder and/or the actuators from travelling beyond the designated print area–which can cause serious damage or breakage to the extruder, glass, and/or the mechanical hardware on the printer.

Important: Each *3DP1000* is tested and calibrated prior to shipping, but it is important to verify the functionality of the sensors–in case of damage or movement during the shipping process.

- Hold a piece of metal–such as a quarter–under each sensor location. The red light indicates the sensor is operational.
- Contact 3DP Unlimited if sensors are non-operational. Do not attempt to operate printer.



4 INSTALL THE DRIVER

Any computer that will be connected to the printer via USB needs to have the driver installed prior to connecting.

Launch the file Taurino-DriverSetup.zip provided on the SD card and follow the installation instructions.

Download Taurino-DriverSetup.zip

5 CONNECT THE USB

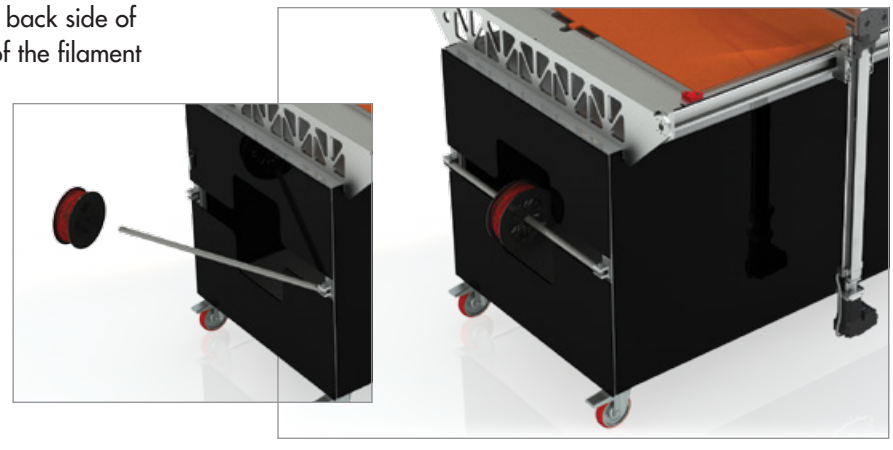
Locate the USB cord on the front of the printer. Plug the USB cord into your computer.

Follow the *Install Software*, *Software Settings*, and *Printer Prep* guidelines in the next sections of this User Manual for completing the connection between your computer and the printer.

6 INSTALL THE SPOOL

The filament spool holder is located on the back side of the printer. Press the latch on the left side of the filament spool holder to release the rod.

Slide the filament roll onto the rod. Secure the filament by snapping the rod back into place.



Install Software | Repetier Host or Simplify 3D

INSTALL RECOMMENDED SOFTWARE

The *3DP1000* printer from 3DP Unlimited utilizes open source controls. This allows users to select and use the software with which they are most comfortable. 3DP Unlimited recommends the use of one of the following two choices. This list provides easy access to software that 3DP Unlimited recommends.

The guidelines for using Repetier Host and Simplify 3d are separated in this User Manual to provide an uninterrupted flow of information. Repetier Host guidelines begin on page 11. Simplify 3D guidelines begin on page 22.

OPTION 1: REPETIER HOST Open Source

Repetier Host is free, open source software used to operate your 3D printer – with controls for temperature, speed, flow, and movement. The program prepares the objects that you want to print, allows you to duplicate, rotate, scale, and arrange them on the print bed. It also includes an interface with Slic3r for easy object manipulation and quality control for printing. **When downloading Repetier Host, Slic3r is downloaded automatically.**

Slic3r is a free, open source software package for visualization and image analysis. The program processes an .stl file (stereolithography file format), cutting the model into horizontal slices – called layers – generating tool paths to fill them and calculating the amount of material that will be extruded.

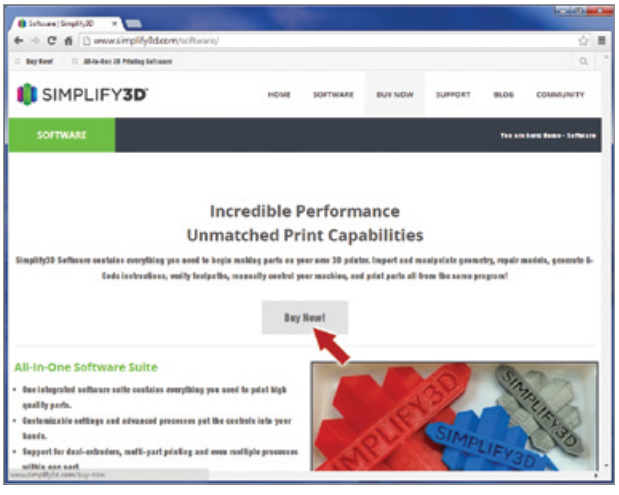
www.repetier.com

www.slic3r.org

Follow detailed user instructions for Repetier Host beginning on page 11.

OPTION 2: SIMPLIFY 3D $140

Simplify 3D software contains everything you need to begin making parts on your new 3D printer. Import and manipulate geometry, repair models, generate G-Code instructions, verify tool paths, manually control your machine, and print parts all from the same program! This is an easy-to-use and highly effective alternative to open source programs.



www.simplify3d.com

Follow detailed user instructions for Simplify 3D beginning on page 22.

REPETIER HOST Software Settings

Begin the setup process by selecting *Printer Settings* from the upper right corner of the screen. Add the settings for the *3DP1000* printer as shown below.

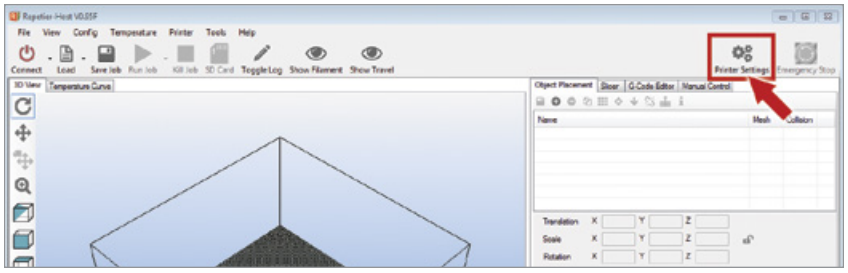
Tab 1: Connection

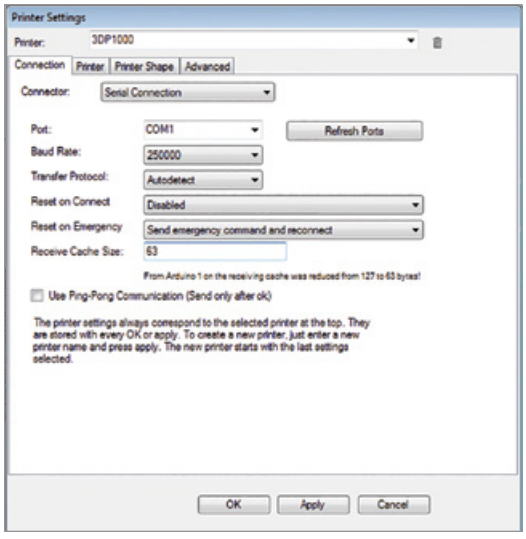
Tab 2: Printer

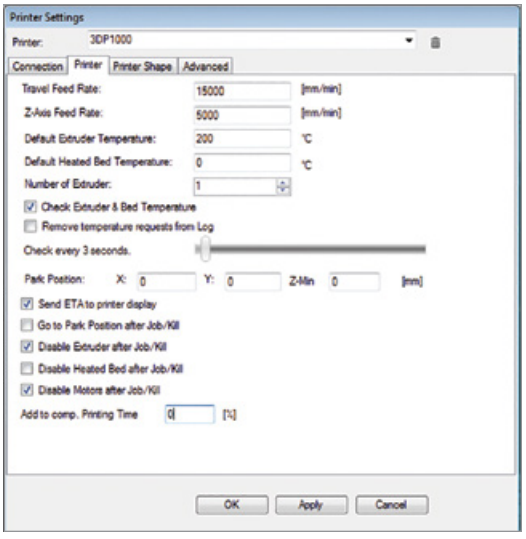
Tab 3: Printer Shape

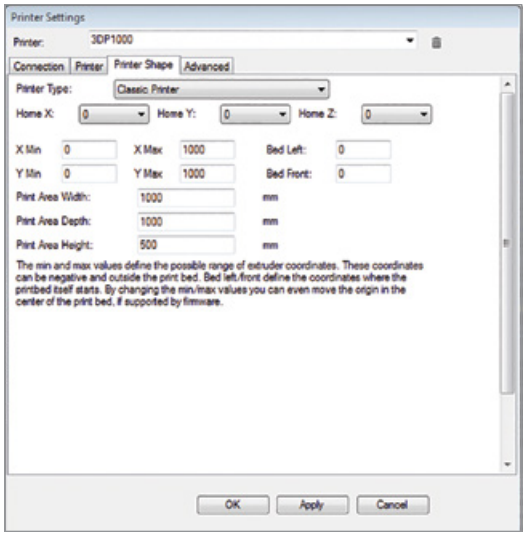
Tab 4: Advanced

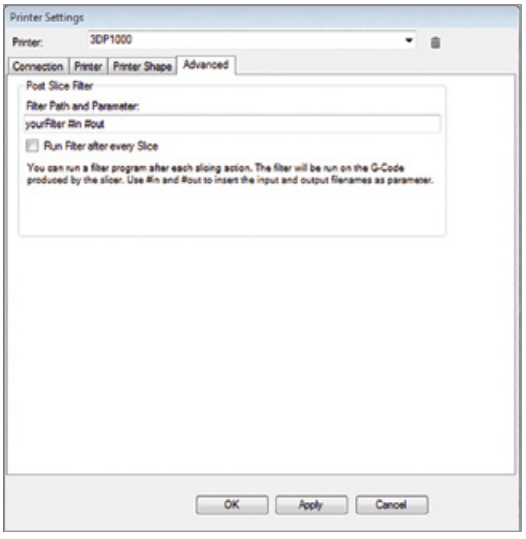
Visit http://www.repetier.com/documentation/repetier-host/ for software usage instructions.




Printer Settings
Printer: 3DP1000
Connection
Printer
Printer Shape
Advanced
Connector: Serial Connection
Port: COM1
Refresh Ports
Baud Rate: 250000
Transfer Protocol: Autodetect
Reset on Connect: Disabled
Reset on Emergency: Send emergency command and reconnect
Receive Cache Size: 63
Use Ping-Pong Communication (Send only after ok)
The printer settings always correspond to the selected printer at the top. They are stored with every OK or apply. To create a new printer, just enter a new printer name and press apply. The new printer starts with the last settings selected.
OK
Apply
Cancel




Printer Settings
Printer: 3DP1000
Connection
Printer
Printer Shape
Advanced
Printer Type: Classic Printer
Home X: 0 Home Y: 0 Home Z: 0
X Min 0 X Max 1000 Bed Left: 0
Y Min 0 Y Max 1000 Bed Front: 0
Print Area Width: 1000 mm
Print Area Depth: 1000 mm
Print Area Height: 500 mm
The min and max values define the possible range of extruder coordinates. These coordinates can be negative and outside the print bed. Bed left/front define the coordinates where the printbed itself starts. By changing the min/max values you can even move the origin in the center of the print bed, if supported by firmware.
OK
Apply
Cancel


Printer Settings
Printer: 3DP1000
Connection
Printer
Printer Shape
Advanced
Post Slice Filter
Filter Path and Parameter:
yourFilter #in #out
Run Filter after every Slice
You can run a filter program after each slicing action. The filter will be run on the G-Code produced by the slicer. Use #in and #out to insert the input and output filenames as parameter.
OK
Apply
Cancel

Software Settings | Initial Setup

SLIC3R Software Settings

Begin the setup process by selecting the *Slicer* tab within Repetier Host. Click the *Configure* tab to open Slic3r.

Download Config-Slicer-3dp1000.ini

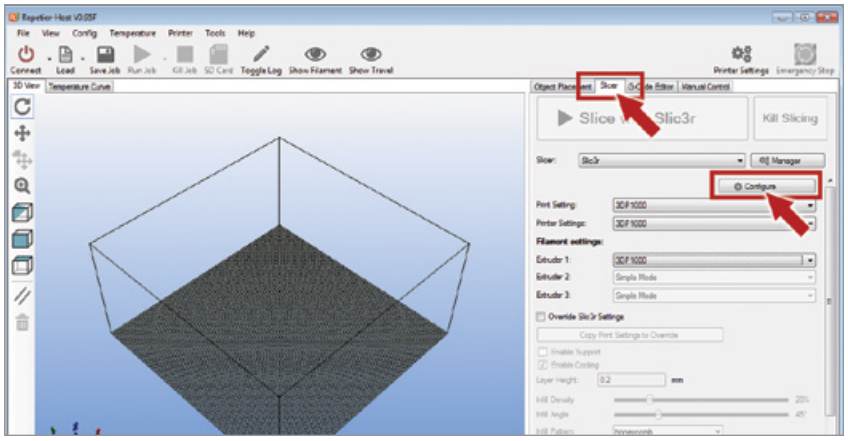
Add the settings for the *3DP1000* printer. For each tab (*Print Settings, Filament Settings, Printer Settings*), choose *File, Load Config*, then select *Config-Slicer-3dp1000.ini* from the supplied sd card

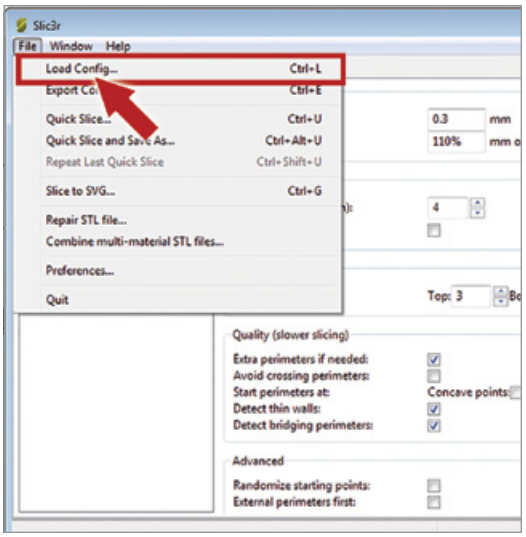
Note: Save the configuration files for each tab on your local machine for future use.

Tab 1: Print Settings
- Layers and perimeters
- Infill
- Speed
- Skirt and brim
- Support material
- Notes
- Output options
- Multiple extruders
- Advanced

Tab 2: Filament Settings
- Filament
- Cooling

Tab 3: Printer Settings
- General
- Custom G-code
- Extruder 1



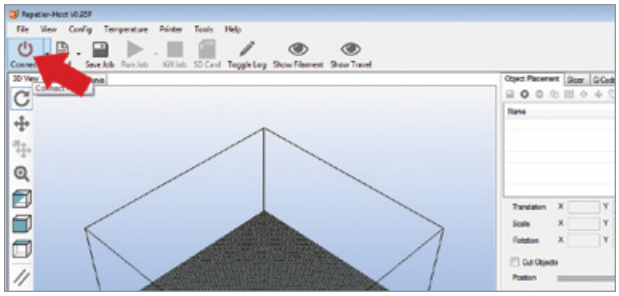


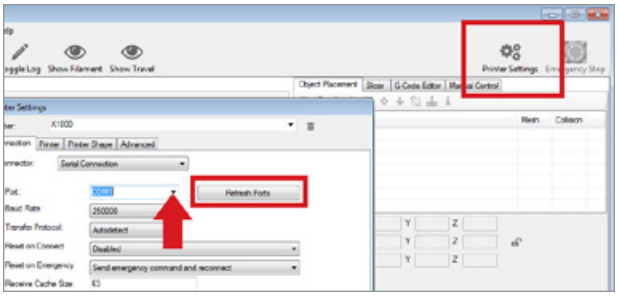
Visit http://manual.slic3r.org/ for software usage instructions.

1 CONNECT YOUR COMPUTER

Launch Repetier Host and click *Connect* in the upper left corner of the screen.

If you are not immediately connected: Click *Printer Settings* in the upper right corner, then *Refresh Ports*. Give your computer a moment to search then click the arrow to select the new com port that was found.



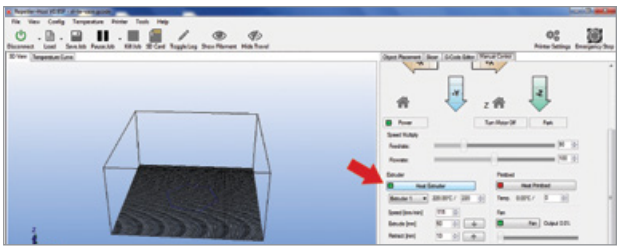


2 HEAT THE EXTRUDER

There are two ways to preheat the extruder.

1. Press the button on the LCD Screen, select *Prepare*, select *Preheat PLA*.
2. Preheat using your computer/software.
   a. Repetier Host: In the *Manual Control* tab, set the temperature for *Extruder 1*.

Refer to the *Suggested Temperature* table on page 17.



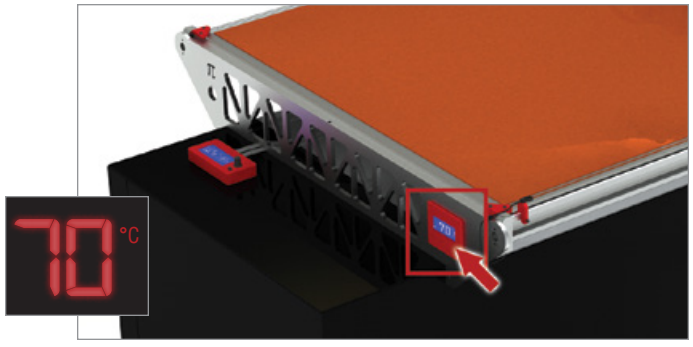
3 HEAT THE PRINT BED

Set the print bed heat to 70° C. This is your initial bed temperature. Additional heat may be necessary depending on what print material is used.

Refer to the *Suggested Temperature* table on page 17.

Note: Turning the bed heat on in the setup process will allow time to reach optimal temperature.

Download the manufacturer's user manual



Printer Prep | Initial Setup

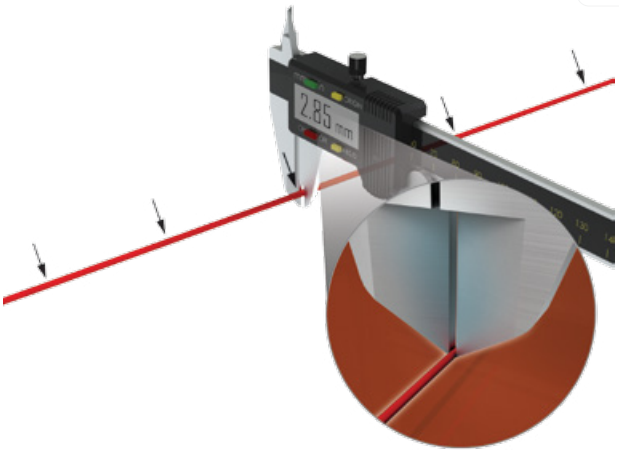
4 MEASURE THE FILAMENT

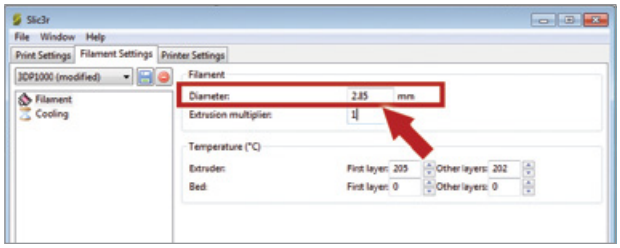
Tools Required
- Micrometer

The standard nozzle for a *3DP1000* printer is .4 mm which requires 3 mm filament. However, filament diameters vary depending on manufacturer. For consistent layer resolution and high print quality, two measurements are recommended.

Measure the filament diameter with a micrometer in several areas along the filament roll. Enter the actual diameter in the slicing software.

a. Repetier Host: *Slicer* tab, *Configure*, *Filament Settings* tab.





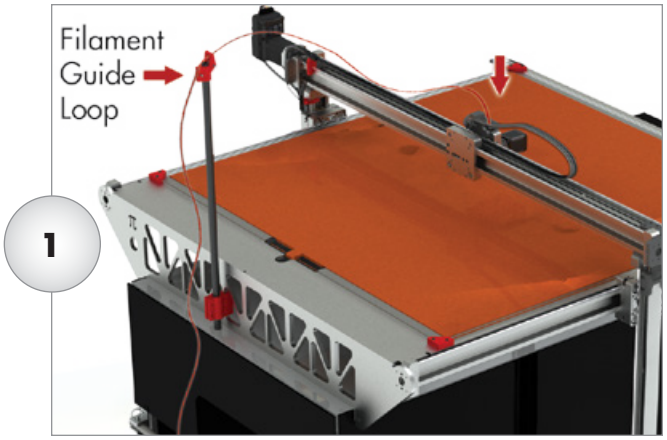
5 LOAD THE FILAMENT

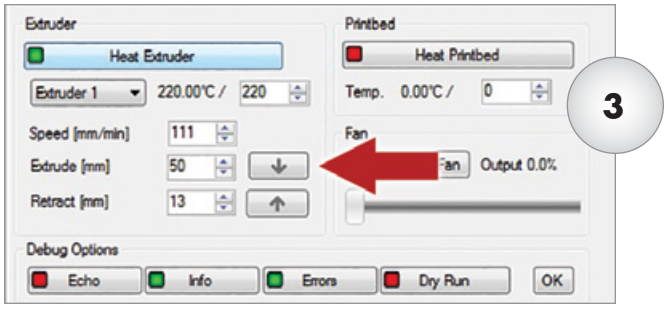
1. Feed the filament through the filament guide. Press and hold the bolt on the extruder to release the hob while pressing firmly to insert the filament.

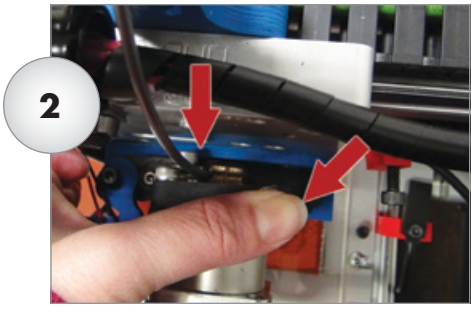
Note: Hold the filament firmly and exert pressure until it begins to extrude from the bottom of the nozzle. Make sure the extruder is heated prior to loading filament.

2. With the z axis raised up from the glass, extrude a length of filament until it is flowing from the extruder in a smooth, consistent bead.

   a. Repetier Host: *Manual Control* tab, Set *Extrude* length (mm), click the ↓ to extrude.







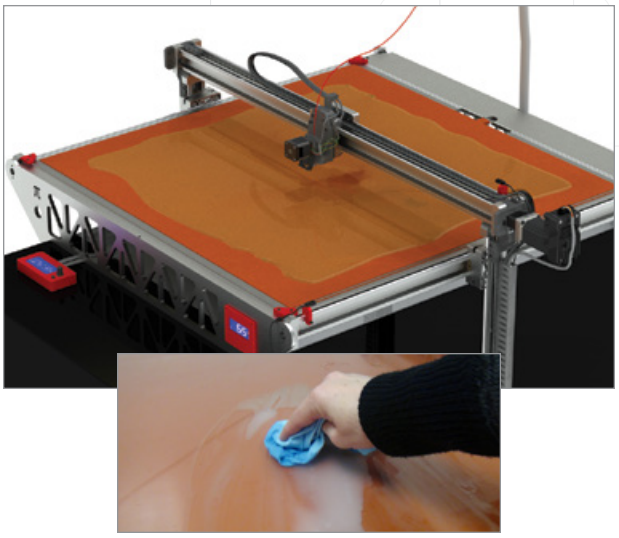
6 PREPARE THE PRINT BED

Prepare the build area for printing. In order for your prints to adhere to the borosilicate glass – it needs to be sticky! We have found that using a sugary substance, such as beer or soda, works quite well.

Pour a liberal amount onto the build area. Spread it around, let it dry, and repeat. The stickier the glass is, the better your print will stick!

Make sure you have covered the entire area that your print will touch. If you start your print and one area is not sticking – add more sticky substance to that area.

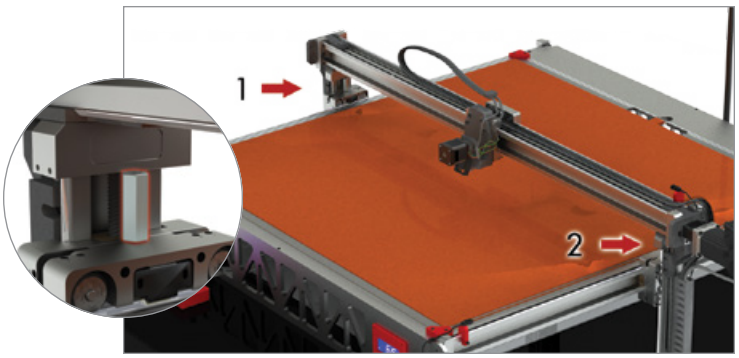
Note: Do not use glass cleaner or alcohol on the glass. Use the same sticky substance between prints to remove any debris.



7 REMOVE Z-STOPS

Z-Stops are used for holding the Z axis position during shipping. Remove the (two) Z-Stops prior to homing. Raise the Z axis slightly to remove the Z-Stops.

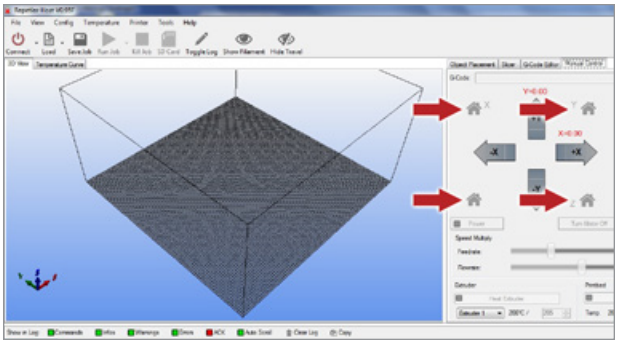
1. Press the button on the LCD Screen, select *Prepare,* select *Move Axis,* select *Move 1 mm,* select *Z Axis,* turn knob right to move Z axis up.
2. Raise the Z axis using your computer/software.
   a. Repetier Host: In the *Manual Control* tab, click the *+Z* arrow.



8 HOME THE X, Y, Z AXES

There are two ways to home the X, Y, Z axes.

1. Press the button on the LCD Screen, select *Prepare,* select *Auto home.*
2. Home the axes using your computer/software.
   a. Repetier Host: In the *Manual Control* tab, click the *Home* button. Home individual axis (X, Y, Z) or all axes.



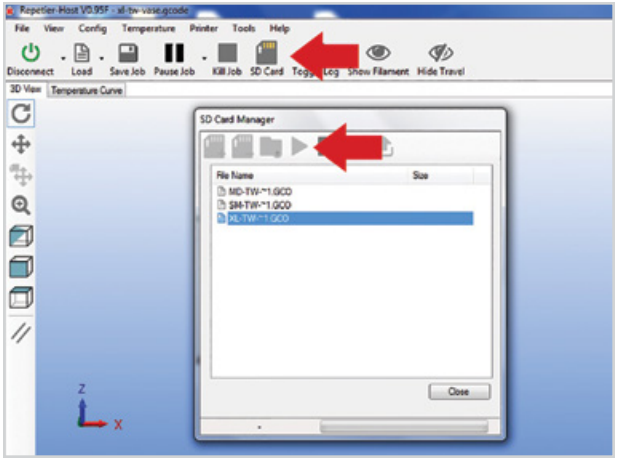
⚠ CAUTION

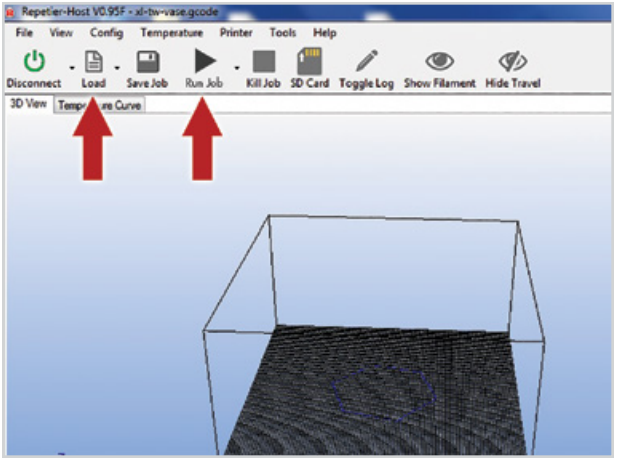
Always home all axis prior to printing!

Sending .gcode to the Printer

There are three ways to send a gcode file to the *3DP1000* printer.

1. Save the gcode on the SD card and put the SD card in the slot located on the LCD Screen. Press the button on the LCD Screen, select *Print from SD*.
   Note: See *LCD Screen Operation* section below for operating the prnter entirely with the LCD screen.
2. Save the gcode on the SD card and put the SD card in the slot located on the LCD Screen. Print from the SD card using Repetier Host. Click *SD Card*. This will open the contents of the sd card. Select the gcode file you want then press the (▶) print button.
3. Print from your computer using the USB connection and Repetier Host. Click *Load*. This will allow you to load the gcode file into Repetier Host. Then click *Run Job* to send the file to the printer.


File View Config Temperature Printer Tools Help
Disconnect Load Save Job Pause Job Kill Job SD Card Toggle Log Show Filament Hide Travel
3D View Temperature Curve
SD Card Manager
File Name Size
Close


File View Config Temperature Printer Tools Help
Disconnect Load Save Job Run Job Kill Job SD Card Toggle Log Show Filament Hide Travel
3D View

LCD SCREEN OPERATION

1. Process a 3D model using the software of your choice.
2. Output a .gcode and save it to an SD card.
3. Insert the SD card into the card reader located on the side of the LCD screen on the printer.
4. Visit www.3dpunlimited.com for instructions on how to utilize the LCD screen to independently operate your *3DP1000* printer without the connectivity of a computer.

Z-GAP, LEVELING, AND TEMPERATURE

Your *3DP1000* printer was calibrated and leveled prior to shipping. However, calibration/test prints are recommended due to changes that may have occurred during the shipping process.

The proper calibration of three factors is paramount to producing successful prints with the *3DP1000* 3D printer.

1. Z-Gap
2. Bed Leveling
3. Temperature of Nozzle and Extruder

Link to article: The Two Things You Must Do For Successful 3D Printing

Use the files on the supplied SD card, the recommended settings shown below, and the detailed instructions on the following pages to properly calibrate and test your printer.

Files on Supplied SD Card

	DOWNLOAD	FILE NAME	BASIC INSTRUCTIONS
1		Config-Slicer-3dp1000.ini	Use with Repetier Host /Slicer software. Load configuration file to import standard operational settings for the *3DP1000* printer.
2		Config-S3D-3dp1000.fff	Use with Simplify 3D software. Load configuration file to import standard operational settings for the *3DP1000* printer.
3		Bed-level-test.stl	Apply suggested print settings. Output gcode. Run this print to verify the bed is level. Make adjustments to bed while print is running until a uniform bead is printed.
4		Calibration1-40mm-cube.stl	Apply suggested print settings. Output gcode. Run this print to test quality.
5		Calibration2-binka-test.stl	Apply suggested print settings. Output gcode. Run this print to test quality.
6		3dp1000-born-on.stl	Apply suggested print settings. Output gcode. Run this print to test quality.
7		Taurino-DriverSetup.zip	This is the driver that must be installed on your computer before plugging into the printer via the USB.

Suggested Temperatures

MATERIAL	RECOMMENDED	
	EXTRUDER TEMP	BED TEMP
PLA	195-210° C	70° C
ABS	240-250° C	115° C
Ninja Flex	220-230° C	40-50° C
Nylon	230-265° C	115° C
PC	+250° C	125-130° C
HIPS	230° C	80° C
PVA	200° C	85° C

Note: The temperatures shown above are intended to provide a starting point when initially using different materials. Fine tuning and temperature adjustments should be expected. Also see filament manufacturer recommended temperatures.

Suggested Print Settings

FILES INCLUDED WITH PRINTER ON SD CARD	LAYER HEIGHT	PERIMETERS	TOP SOLID LAYERS	BOTTOM SOLID LAYERS	INFILL	APPROX. PRINT TIME
Calibration1-40mm-cube.stl	.24	1	0	3	0	.21 hr
Calibration2-binka-test.stl	.24	2	3	3	.5	.46 hr
Bed-level-test.stl	.24	10	0	0	0	.20 hr
3dp1000-born-on.stl	.24	2	3	3	.3	1 hr

Note: The suggested print settings shown above are intended to provide a starting point when initially using the *3DP1000* printer. These settings are user-defined in the slicing software and therefore can be adjusted for each print. Additionally, *3DP1000* printer has a unique Z-Gap which requires a Z offset entry in the slicing software before slicing.

File Processing | Key Considerations

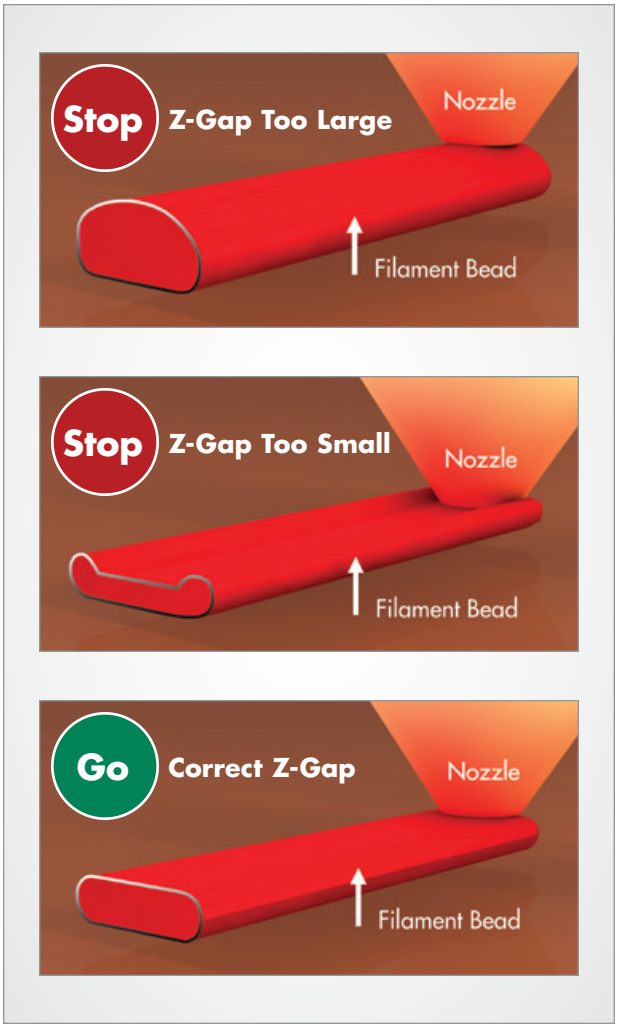
1 Z-GAP

What is Z-Gap? The Z-Gap is the distance your extruder is away from the glass of the print bed when it begins extruding. Each *3DP1000* printer is equipped with X, Y, and Z axis position sensors. So, the Z-Gap can be thought of as the space between the Home Z setting and the place where the extruder needs to be to lay down the first layer of filament.

The **Z-Offset** in Slic3r compensates for the **Z-Gap** in the *3DP1000* Printer

In order to adjust the Z-Gap, you need to define the Z-Offset in the software prior to slicing.

- Each *3DP1000* printer has a unique Z-Offset supplied with the printer, which compensates for the Z-Gap.



Why is Z-Gap and Z-Offset Important?

- If the Z-Gap is too large, the extruded filament bead will not contact the glass properly, resulting in a round bead of filament. This could lead to a first layer that is not adhered to the print bed and a failed print.

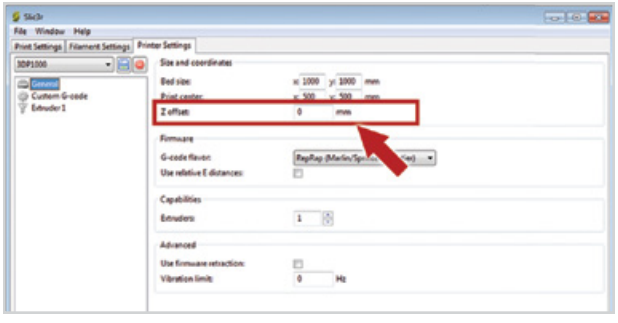
- If the Z-Gap is too small, the extruded filament is pushed down creating a wider bead than intended, as well as an uneven layer height. Additionally, a Z-Gap that does not allow sufficient room for the filament to extrude can cause backpressure and problems with the extruder.

How to Enter the Z-Offset

Apply the Z-Offset that was provided with the purchase of your *3DP1000* printer.

1. Repetier Host: *Slicer* tab, *Configure*. Slicer: *Printer Settings* tab, enter *Z offset* (in mm).

2. Adjust the Z-Offset if necessary to achieve a good filament bead in your initial calibration prints.



2 LEVELING THE PRINT BED

Why is Leveling Important? A level print bed is critical to overall print quality–especially for consistent first-layer adhesion.

- If one section of the print bed is lower than another, the first layer might not adhere properly.
- If one section of the print bed is higher than another, the glass might block the filament from flowing freely from the nozzle.

Tools Required
- Metric Allen Wrench or Hex Key Set

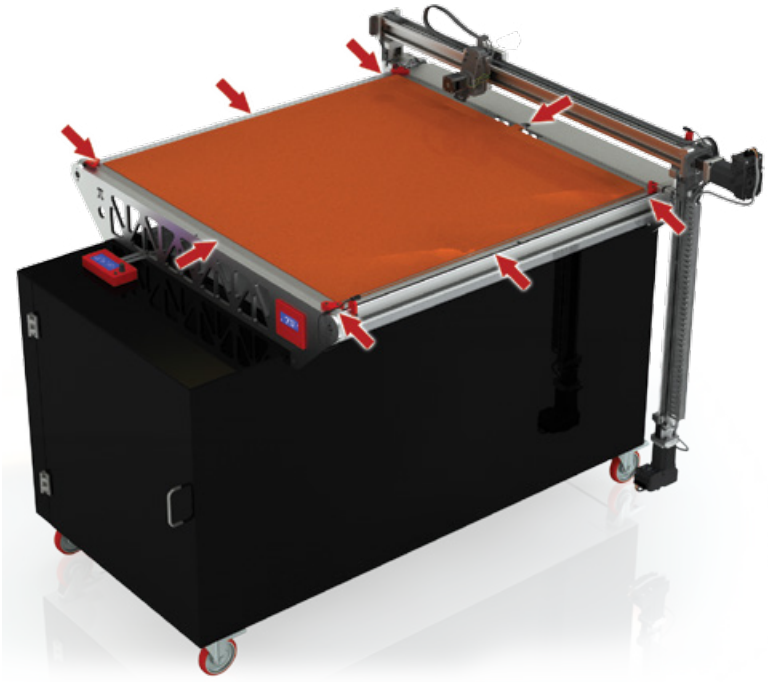
Download Bed-level-test.stl

How to Level the *3DP1000* Print bed

1. Use the recommended print settings found on page 17 and the provided Z offset of your machine to slice, export gcode, and print the provided file: Bed-level-test.stl.

   Monitor the print. As the filament is printed, raise or lower each section of the print bed where the filament bead is not consistent, until a consistent bead is produced.

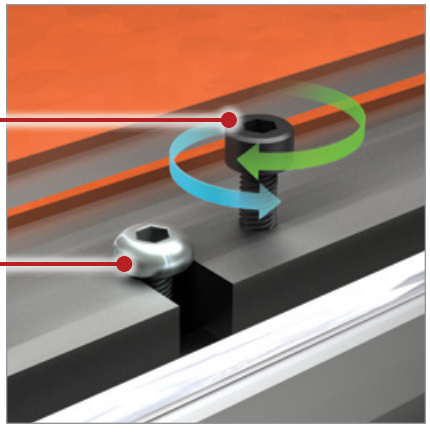
2. There are eight (8) locations for leveling the bed, each with a Socket Head Screw for raising and lowing the print bed, and a Button Head Screw for locking the position.
   a. Loosen the Button Head Screw (but do not remove).
   b. Turn the Socket Head Screw clockwise to raise the print bed, counter-clockwise to lower the bed.
   c. Tighten the Button Head Screw to lock the leveled position of the bed.



Link to article: The Importance of a Level Print Bed on a 3D Printer

Socket Head Screw
for raising and lowering the print bed.

Button Head Screw
for locking the print bed into a set position.



File Processing | Key Considerations

3 TEMPERATURE

Extruder Temperature

Each material you use with the *3DP1000* printer will likely require a different temperature for the extruder. Start with the temperatures provided and make adjustments as needed.

- If your extruder is not hot enough, the filament may not adhere from layer to layer.
- If your extruder is too hot, the filament may warp or you may see an unwanted variance in layer width.

Print Bed Temperature

The print bed on the *3DP1000* printer is heated to provide better adhesion of your printed parts. Each material you use will likely require a different bed temperature.

- For easy removal of large or small parts, simply turn your bed temperature down to 20° C. You will hear the plastic loosening and the part will pop off the print bed.

Watch the video: What Materials Can Print on a 3DP1000

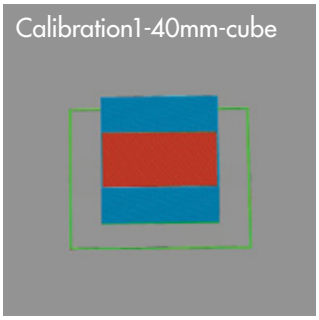
Suggested Temperatures

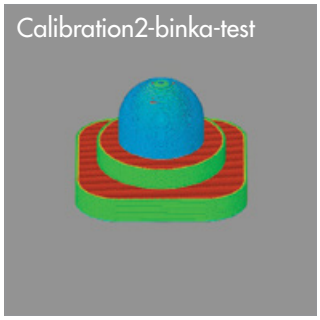
MATERIAL	RECOMMENDED	
	EXTRUDER TEMP	BED TEMP
PLA	195-210° C	70° C
ABS	240-250° C	115° C
Ninja Flex	220-230° C	40-50° C
Nylon	230-265° C	115° C
PC	+250° C	125-130° C
HIPS	230° C	80° C
PVA	200° C	85° C

Note: The temperatures shown above are intended to provide a starting point when initially using different materials. Fine tuning and temperature adjustments should be expected. Also see filament manufacturer recommended temperatures.

CALIBRATION & TEST PRINTS

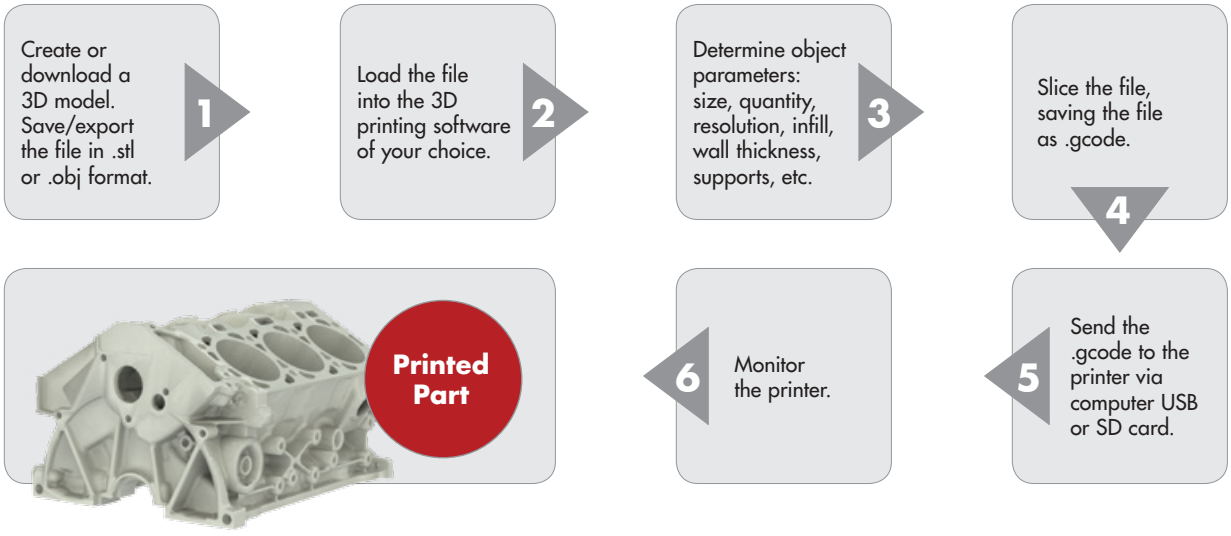
- Verify your print bed is level using the bed leveling file supplied (Bed-level-test.stl) and making adjustments as it prints.
- Use the recommended slice settings found on page 17 to prepare and print the supplied calibration files. Monitor your printer during all prints to verify quality.
    a. Calibration1-40mm-cube.stl
    b. Calibration2-binka-test.stl
- Once your machine is calibrated you are ready to go! Prepare and print 3dp1000-born-on.stl and then the sky is the limit! Enjoy your *3DP1000*!





FUTURE PRINTING

Congratulations! You have successfully set up your *3DP1000* printer. For future prints, follow the standard 3DP workflow.


Create or download a 3D model. Save/export the file in .stl or .obj format.
1
Load the file into the 3D printing software of your choice.
2
Determine object parameters: size, quantity, resolution, infill, wall thickness, supports, etc.
3
Slice the file, saving the file as .gcode.
4
Send the .gcode to the printer via computer USB or SD card.
5
Monitor the printer.
6
Printed Part

You have reached the end of the instructions dedicated to Repetier Host. If you would like to skip the instructions dedicated to Simplify 3D and go straight to Section 7–Troubleshooting on page 32.

Software Settings | Initial Setup

SIMPLIFY 3D Software Settings

Begin the setup process by selecting *Add* a new process from the *Processes* section in the lower left corner of the screen. Add the settings for the *3DP1000* by clicking *Import* in the *FFF* (Fused Filament Fabrication) *Settings* screen.

Download Config-S3D-3dp1000.fff

Step 1: Connect

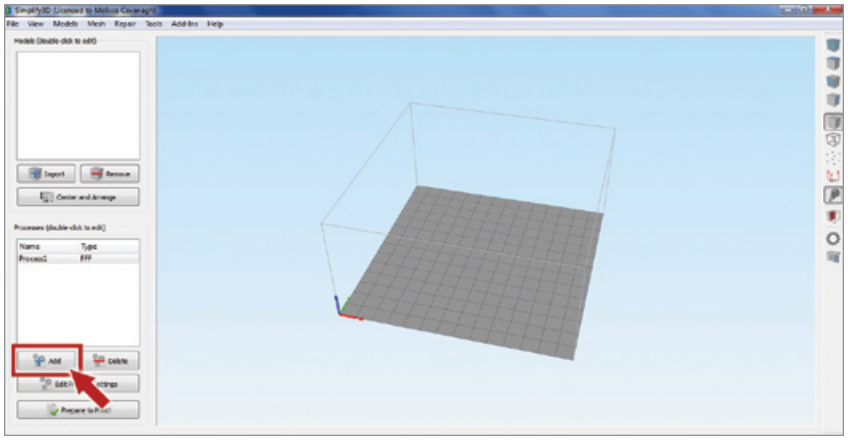
Step 2: Import FFF Setting for *3DP1000*

Step 3: Import Model

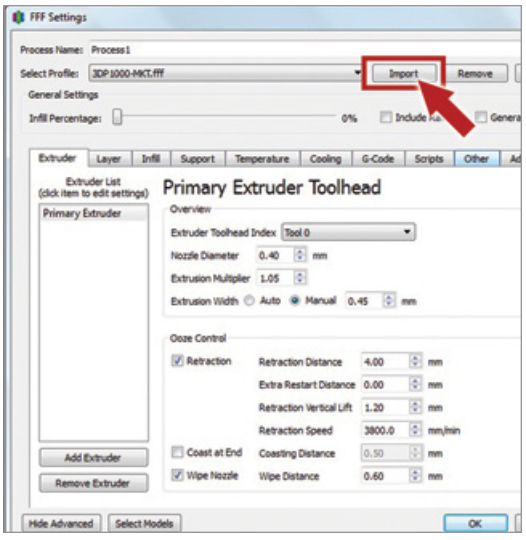
Step 4: Adjust the *Process* that specifies how your model will be constructed.

Note: A *Process* is a collection of settings including speed, size, temperature, support structures, print resolution, infill, etc. Export and re-name each unique process on your local machine for future use.

Visit http://www.simplify3d.com/support/ for software usage instructions.



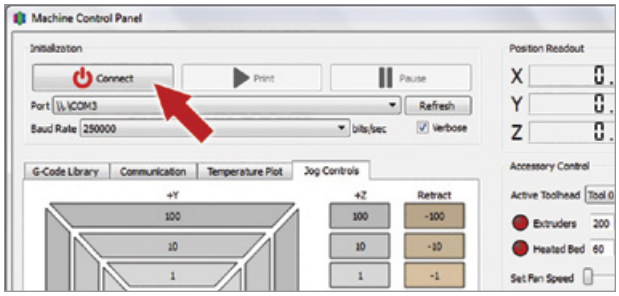
Link to article: Hands on with Simplify 3D

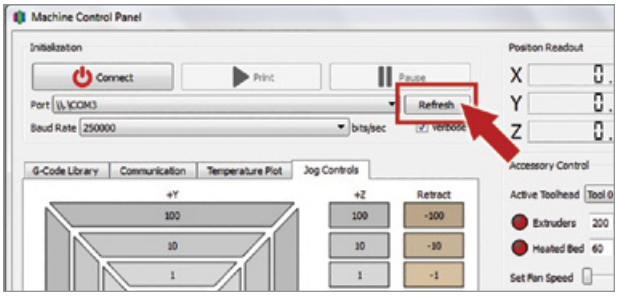


1 CONNECT YOUR COMPUTER

Launch Simplify 3D and click ⚙ to open the *Machine Control Panel.* Then click *Connect* in the upper left corner of the screen.

If you are not immediately connected: Click *Refresh.* Give your computer a moment to search then click the arrow to select the new port that was found.



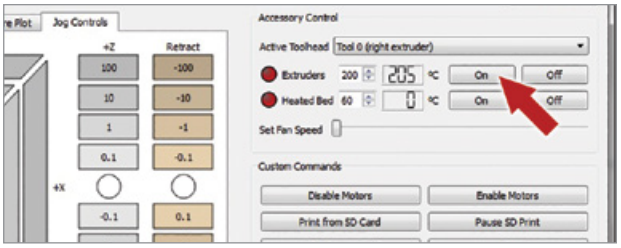


2 HEAT THE EXTRUDER

There are two ways to preheat the extruder.

1. Press the button on the LCD Screen, select *Prepare,* select *Preheat PLA.*
2. Preheat using your computer/software.
   a. Simplify 3D: In the *Machine Control Panel,* set the temperature and click *On.*

Refer to the *Suggested Temperature* table on page 30.

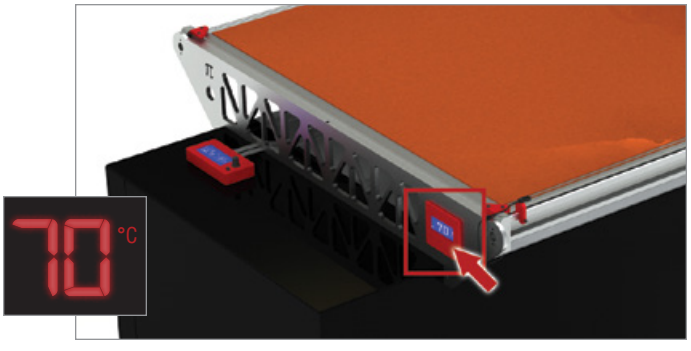


3 HEAT THE PRINT BED

Set the print bed heat to 70° C. This is your initial bed temperature. Additional heat may be necessary depending on what print material is used.

Refer to the *Suggested Temperature* table on page 30.

Note: Turning the bed heat on in the setup process will allow time to reach optimal temperature.



Download the manufacturer's user manual

Printer Prep | Initial Setup

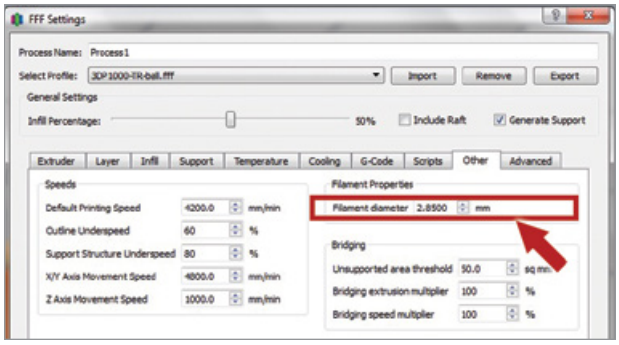
4 MEASURE THE FILAMENT

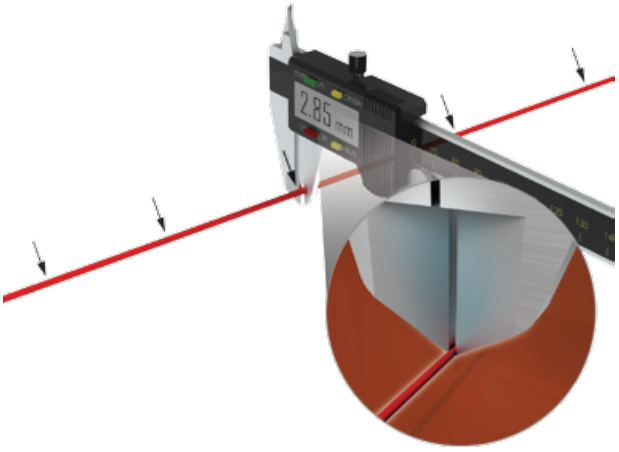
The standard nozzle for a *3DP1000* printer is .4 mm which requires 3 mm filament. However, filament diameters vary depending on manufacturer. For consistent layer resolution and high print quality, two measurements are recommended.

Measure the filament diameter with a micrometer in several areas along the filament roll. Enter the actual diameter in the slicing software.

a. Simplify 3D: *Edit Process Settings, Other* tab.

Tools Required
• Micrometer



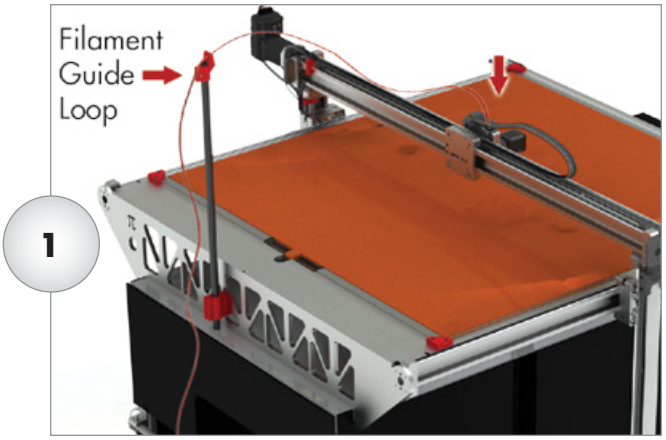


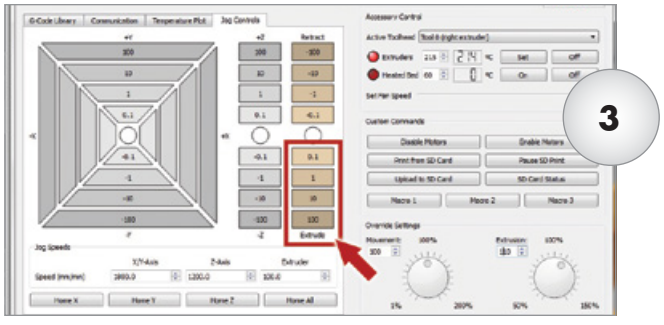
5 LOAD THE FILAMENT

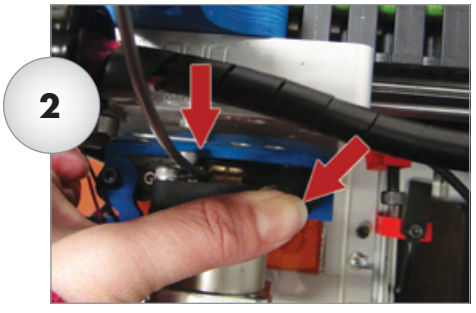
1. Feed the filament through the filament guide loop. Press and hold the bolt on the extruder to release the hob while pressing firmly to insert the filament.

Note: Hold the filament firmly and exert pressure until it begins to extrude from the bottom of the nozzle. Make sure the extruder is heated prior to loading filament.

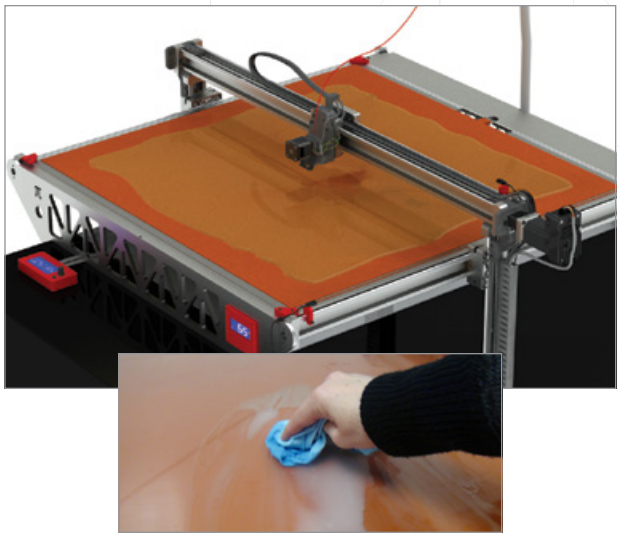
2. With the z axis raised up from the glass, extrude a length of filament until it is flowing from the extruder in a smooth, consistent bead.
   a. Simplify 3D: *Machine Control Panel, Jog Controls* tab, click the value to extrude.







6 PREPARE THE PRINT BED



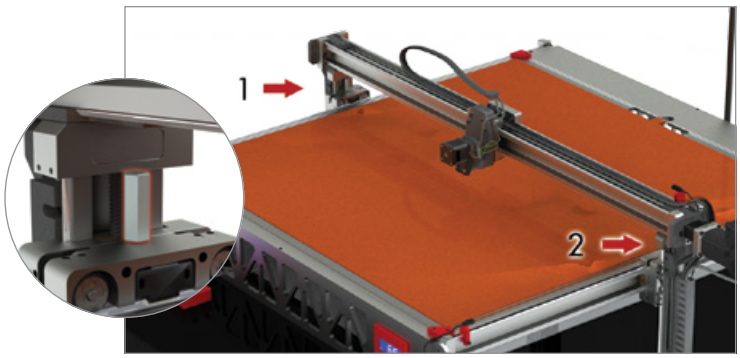
Prepare the build area for printing. In order for your prints to adhere to the borosilicate glass – it needs to be sticky! We have found that using a sugary substance, such as beer or soda, works quite well.

Pour a liberal amount onto the build area. Spread it around, let it dry, and repeat. The stickier the glass is, the better your print will stick!

Make sure you have covered the entire area that your print will touch. If you start your print and one area is not sticking – add more sticky substance to that area.

Note: Do not use glass cleaner or alcohol on the glass. Use the same sticky substance between prints to remove any debris.

3 REMOVE Z-STOPS



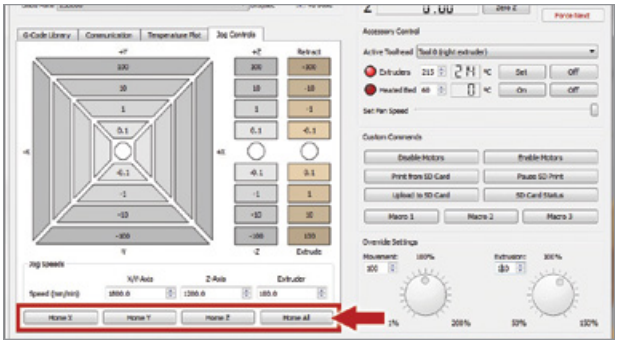
Z-Stops are used for holding the Z axis position during shipping. Remove the (two) Z-Stops prior to homing. Raise the Z axis slightly to remove the Z-Stops.

1. Press the button on the LCD Screen, select *Prepare,* select *Move Axis,* select *Move 1 mm,* select *Z Axis,* turn knob right to move Z axis up.
2. Raise the Z axis using your computer/software.
   a. Simplify 3D: In the *Machine Control Panel,* select the *Jog Controls* tab, click *+Z* to move the Z axis up.

7 HOME THE X, Y, Z AXES

There are two ways to home the X, Y, Z axes.

1. Press the button on the LCD Screen, select *Prepare,* select *Auto home.*
2. Home the axes using your computer/software.
   a. Simplify 3D: In the *Machine Control Panel,* click the *Jog Controls* tab. Home individual axis (X, Y, Z) or all axes.



⚠ CAUTION

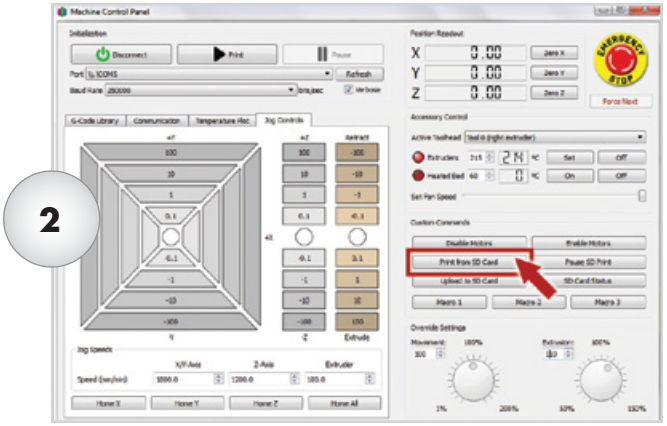
Always home all axes prior to printing!

Sending .gcode to the Printer

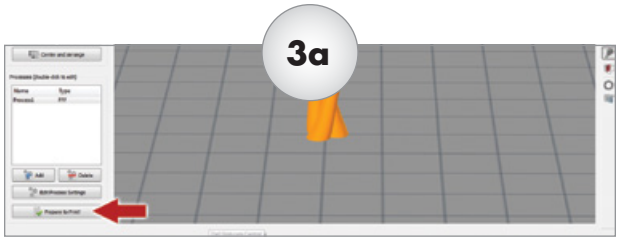
There are three ways to send a gcode file to the *3DP1000* printer.

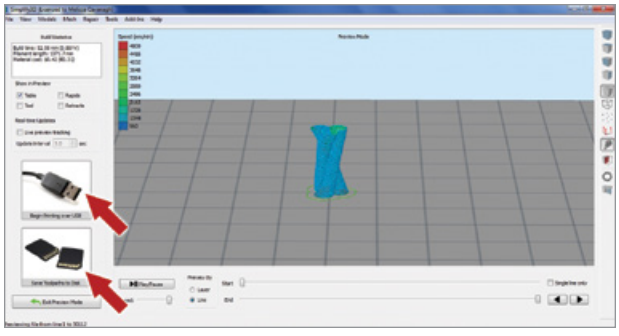
1. Save the gcode on the SD card and put the SD card in the slot located on the LCD Screen. Press the button on the LCD Screen, select *Print from SD.*

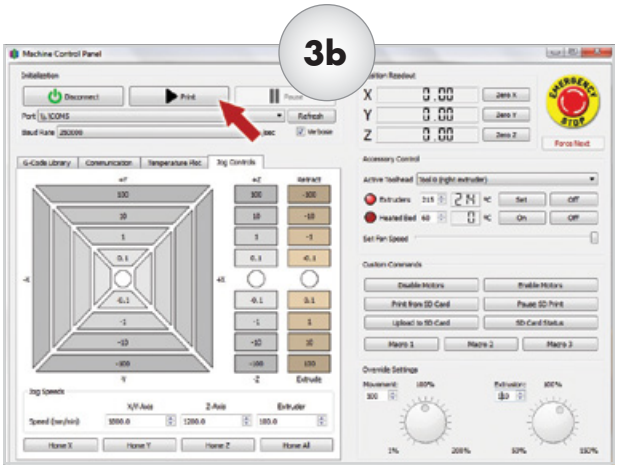
2. Save the gcode on the SD card and put the SD card in the slot located on the LCD Screen. Print from the SD card using Simplify 3D. In the *Machine Control Panel,* select *Print from SD Card.* This will open the contents of the sd card. Select the gcode file you want then press the (▶) print button.



3. Print from your computer using the USB connection and Simplify 3D.
   a. *Import* your object, modify the process settings, then click *Prepare to Print!* In *Preview Mode,* you can select *Begin Printing over USB* or *Save Tool paths to Disk.*
   b. In the *Machine Control Panel,* select *Print, browse to locate the gcode file on your computer then press the* (▶) *print button.*







LCD SCREEN OPERATION

1. Process a 3D model using the software of your choice.
2. Output a .gcode and save it to an SD card.
3. Insert the SD card into the card reader located on the side of the LCD screen on the printer.
4. Visit www.3dpunlimited.com for instructions on how to utilize the LCD screen to independently operate your *3DP1000* printer without the connectivity of a computer.

Z-GAP, LEVELING, AND TEMPERATURE

Your *3DP1000* printer was calibrated and leveled prior to shipping. However, calibration/test prints are recommended due to changes that may have occurred during the shipping process.

The proper calibration of three factors is paramount to producing successful prints with the *3DP1000* 3D printer.

1. Z-Gap
2. Bed Leveling
3. Temperature of Nozzle and Extruder

Link to article: The Two Things You Must Do For Successful 3D Printing

Use the files on the supplied SD card, the recommended settings shown below, and the detailed instructions on the following pages to properly calibrate and test your printer.

Files on Supplied SD Card

DOWNLOAD		FILE NAME	BASIC INSTRUCTIONS
1		Config-Slicer-3dp1000.ini	Use with Repetier Host /Slicer software. Load configuration file to import standard operational settings for the *3DP1000* printer.
2		Config-S3D-3dp1000.fff	Use with Simplify 3D software. Load configuration file to import standard operational settings for the *3DP1000* printer.
3		Bed-level-test.stl	Apply suggested print settings. Output gcode. Run this print to verify the bed is level. Make adjustments to bed while print is running until a uniform bead is printed.
4		Calibration1-40mm-cube.stl	Apply suggested print settings. Output gcode. Run this print to test quality.
5		Calibration2-binka-test.stl	Apply suggested print settings. Output gcode. Run this print to test quality.
6		3dp1000-born-on.stl	Apply suggested print settings. Output gcode. Run this print to test quality.
7		Taurino-DriverSetup.zip	This is the driver that must be installed on your computer before plugging into the printer via the USB.

Suggested Temperatures

MATERIAL	RECOMMENDED	
	EXTRUDER TEMP	BED TEMP
PLA	195-210° C	70° C
ABS	240-250° C	115° C
Ninja Flex	220-230° C	40-50° C
Nylon	230-265° C	115° C
PC	+250° C	125-130° C
HIPS	230° C	80° C
PVA	200° C	85° C

Note: The temperatures shown above are intended to provide a starting point when initially using different materials. Fine tuning and temperature adjustments should be expected. Also see filament manufacturer recommended temperatures.

Suggested Print Settings

FILES INCLUDED WITH PRINTER ON SD CARD	LAYER HEIGHT	PERIMETERS	TOP SOLID LAYERS	BOTTOM SOLID LAYERS	INFILL	APPROX. PRINT TIME
Calibration1-40mm-cube.stl	.24	1	0	3	0	.21 hr
Calibration2-binka-test.stl	.24	2	3	3	.5	.46 hr
Bed-level-test.stl	.24	10	0	0	0	.20 hr
3dp1000-born-on.stl	.24	2	3	3	.3	1 hr

Note: The suggested print settings shown above are intended to provide a starting point when initially using the *3DP1000* printer. These settings are user-defined in the slicing software and therefore can be adjusted for each print. Additionally, *3DP1000* printer has a unique Z-Gap which requires a Z offset entry in the slicing software before slicing.

File Processing | Key Considerations

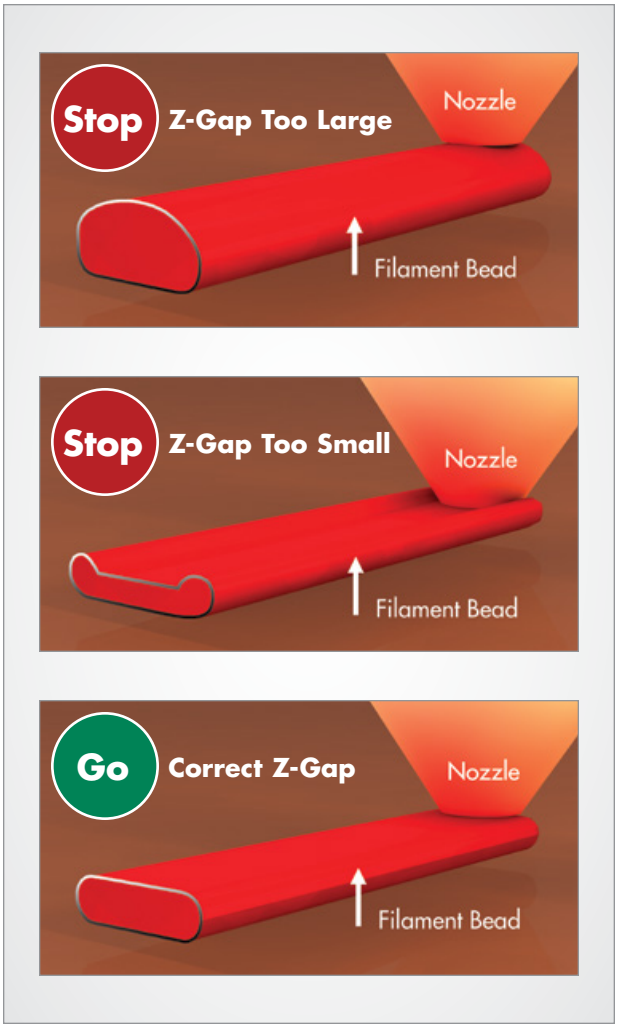
1 Z-GAP

What is Z-Gap? The Z-Gap is the distance your extruder is away from the glass of the print bed when it begins extruding. Each *3DP1000* printer is equipped with X, Y, and Z axis position sensors. So, the Z-Gap can be thought of as the space between the Home Z setting and the place where the extruder needs to be to lay down the first layer of filament.

The **Z-Offset** in Slic3r compensates for the **Z-Gap** in the *3DP1000* Printer

In order to adjust the Z-Gap, you need to define the Z-Offset in the software prior to slicing.

- Each *3DP1000* printer has a unique Z-Offset– supplied with the printer, which compensates for the Z-Gap.



Why is Z-Gap and Z-Offset Important?

- If the Z-Gap is too large, the extruded filament bead will not contact the glass properly, resulting in a round bead of filament. This could lead to a first layer that is not adhered to the print bed and a failed print.

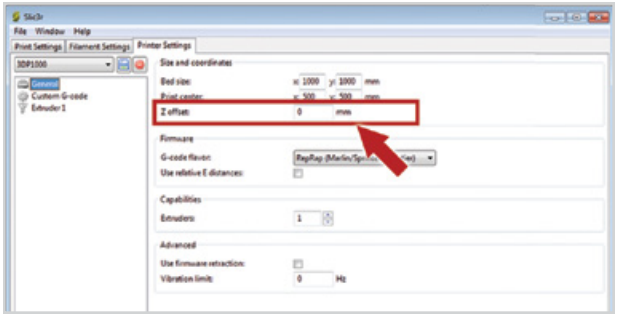
- If the Z-Gap is too small, the extruded filament is pushed down creating a wider bead than intended, as well as an uneven layer height. Additionally, a Z-Gap that does not allow sufficient room for the filament to extrude can cause backpressure and problems with the extruder.

How to Enter the Z-Offset

Apply the Z-Offset that was provided with the purchase of your *3DP1000* printer.

1. Repetier Host: *Slicer* tab, *Configure*. Slicer: *Printer Settings* tab, enter *Z offset* (in mm).

2. Adjust the Z-Offset if necessary to achieve a good filament bead in your initial calibration prints.



2 LEVELING THE PRINT BED

Why is Leveling Important? A level print bed is critical to overall print quality–especially for consistent first-layer adhesion.

- If one section of the print bed is lower than another, the first layer might not adhere properly.
- If one section of the print bed is higher than another, the glass might block the filament from flowing freely from the nozzle.

Tools Required
- Metric Allen Wrench or Hex Key Set

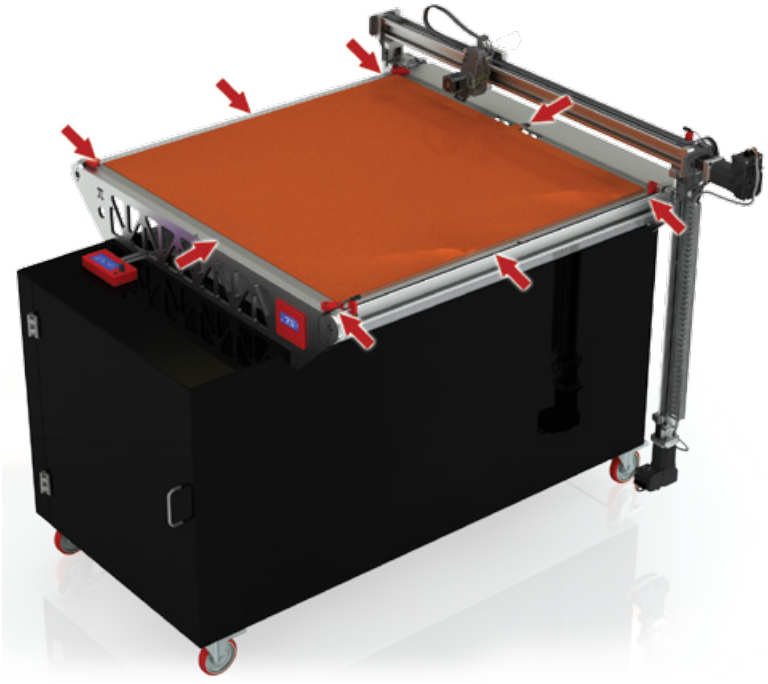
Download Bed-level-test.stl

How to Level the *3DP1000* Print bed

1. Use the recommended print settings found on page 28 and the provided Z offset of your machine to slice, export gcode, and print the provided file: Bed-level-test.stl.

   Monitor the print. As the filament is printed, raise or lower each section of the print bed where the filament bead is not consistent, until a consistent bead is produced.

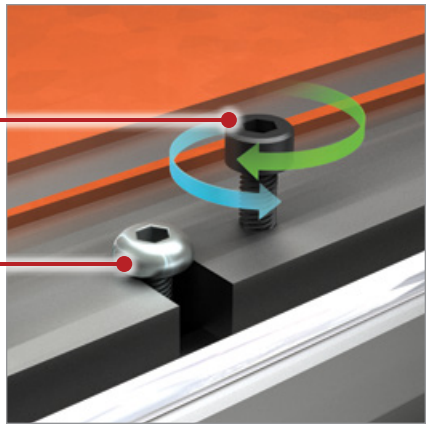
2. There are eight (8) locations for leveling the bed, each with a Socket Head Screw for raising and lowing the print bed, and a Button Head Screw for locking the position.
   a. Loosen the Button Head Screw (but do not remove).
   b. Turn the Socket Head Screw clockwise to raise the print bed, counter-clockwise to lower the bed.
   c. Tighten the Button Head Screw to lock the leveled position of the bed.



Link to article: The Importance of a Level Print Bed on a 3D Printer

Socket Head Screw
for raising and lowering the print bed.

Button Head Screw
for locking the print bed into a set position.



File Processing | Key Considerations

3 TEMPERATURE

Extruder Temperature

Each material you use with the *3DP1000* printer will likely require a different temperature for the extruder. Start with the temperatures provided and make adjustments as needed.

- If your extruder is not hot enough, the filament may not adhere from layer to layer.
- If your extruder is too hot, the filament may warp or you may see an unwanted variance in layer width.

Print Bed Temperature

The print bed on the *3DP1000* printer is heated to provide better adhesion of your printed parts. Each material you use will likely require a different bed temperature.

- For easy removal of large or small parts, simply turn your bed temperature down to 20° C. You will hear the plastic loosening and the part will pop off the print bed.

Suggested Temperatures

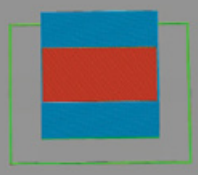
MATERIAL	RECOMMENDED	
	EXTRUDER TEMP	BED TEMP
PLA	195-210° C	70° C
ABS	240-250° C	115° C
Ninja Flex	220-230° C	40-50° C
Nylon	230-265° C	115° C
PC	+250° C	125-130° C
HIPS	230° C	80° C
PVA	200° C	85° C

Note: The temperatures shown above are intended to provide a starting point when initially using different materials. Fine tuning and temperature adjustments should be expected. Also see filament manufacturer recommended temperatures.

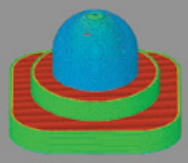
CALIBRATION & TEST PRINTS

- Verify your print bed is level using the bed leveling file supplied (Bed-level-test.stl) and making adjustments as it prints.
- Use the recommended slice settings found on page 27 to prepare and print the supplied calibration files. Monitor your printer during all prints to verify quality.
    a. Calibration1-40mm-cube.stl
    b. Calibration2-binka-test.stl
- Once your machine is calibrated you are ready to go! Prepare and print 3dp1000-born-on.stl and then the sky is the limit! Enjoy your *3DP1000*!

Calibration1-40mm-cube

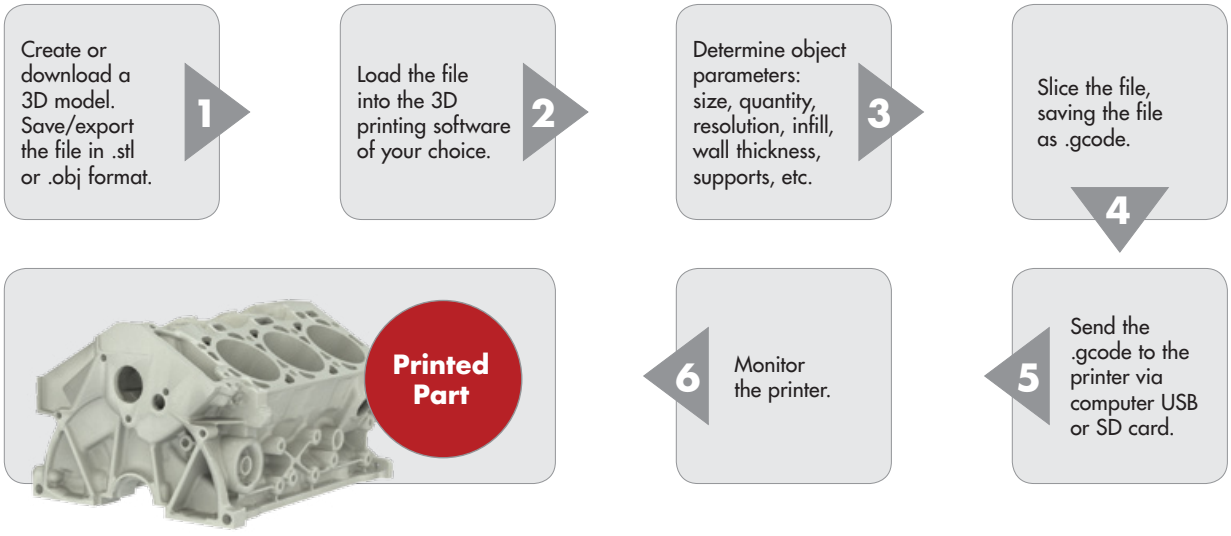


Calibration2-binka-test



FUTURE PRINTING

Congratulations! You have successfully set up your *3DP1000* printer. For future prints, follow the standard 3DP workflow.


Create or download a 3D model. Save/export the file in .stl or .obj format.
1
Load the file into the 3D printing software of your choice.
2
Determine object parameters: size, quantity, resolution, infill, wall thickness, supports, etc.
3
Slice the file, saving the file as .gcode.
4
Send the .gcode to the printer via computer USB or SD card.
5
Monitor the printer.
6
Printed Part

You have reached the end of the instructions dedicated to Simplify 3D.

Troubleshooting | FAQ, Tips & Tricks

FREQUENTLY ASKED QUESTIONS

Q: What is "open source" and how does it relate to the printers from 3DP Unlimited?

A: The term, Open Source, most commonly refers to a computer program or programs in which the source code is available to the public for use and can be modified from its original design. The *3DP1000* printer from 3DP Unlimited utilizes open source software and control platforms. This provides a cost-effective and easy-to-use interface with the printer.

Q: What type of 3D printer is the *3DP1000*?

A: The *3DP1000* utilizes FFF (Fused Filament Fabrication) printing technology–where a filament of one material (plastic, wax, metal, etc.) is deposited on top of or alongside the same (or similar) material making a joint (by heat or adhesion).

Q: What is the best print quality the *3DP1000* can do? And, what is the relationship between size, quality, and print time?

A: The printer can achieve a layer resolution as fine as 70 microns. A key consideration is the relationship between size, quality, and print time. A part that is 75 mm x 75 mm x 25 mm, with a 300 micron layer resolution, may take 3 hours to print. The same part, with a 70 micron layer resolution, may take up to 10 hours to print. Using this premise, imagine the time needed to print a part that is 1000 mm x 1000 mm x 500 mm.

Q: How big can I make my model?

A: The *3DP1000* print area is 1000 mm x 1000 mm x 500 mm.

Q: What type of file do I send to the printer? And, where can I get files to print?

A: The file type that your printer requires is .gcode – which is created from a 3D model. 3D models can be custom designed in CAD programs such as SolidWorks, Auto CAD, or Google SketchUp. 3D models can also be found online at sites such as: GrabCAD, 3D Marvels, 3D Via, Google 3D Warehouse, Turbosquid, and Thingiverse.

Q: What materials can I use on the *3DP1000* printer?

A: The *3DP1000* printer is capable of printing any material (3 mm spools) which is created for *Fused Filament Fabrication* (FFF), including but not limited to PLA (Polylactic Acid), ABS (Acrylonitrile Butadiene Styrene), PC (Polycarbonate), Nylon, Ninja Flex, and HIPS (High Impact Polystyrene).

Q: How much power is needed to operate the *3DP1000* printer?

A: The *3DP1000* printer is available in both 110 and 220 volt. The 110 volt system provides ample power for printing materials requiring bed temperatures below 70° C. Materials requiring higher bed temperatures, need 220 volts.

Q: What is support material? How does it work with a single extruder and/or a dual extruder?

A: Support structures can be generated in your 3D printing software. They are used to hold up printed parts where the part is not supported – generally any overhang over 45° will require supports. When using a printer with a single extruder, the support material is generated and then broken away after printing. When using a machine with a dual extruder, wash away support material can be utilized.

Q: Can I use filament from any manufacturer?

A: Yes! The *3DP1000* is designed to accommodate filament from multiple manufacturers – as long as it is 3 mm size.

Please visit our website at www.3dpunlimited.com for more information.

TIPS & TRICKS

Please visit our website at www.3dpunlimited.com for tips and tricks and valuable information designed to provide an enjoyable, efficient, and profitable 3D printing experience.

Other Information

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- Nothing contained in this User Manual can be reproduced without written permission from 3DP Unlimited. Use of the www.3dpunlimited.com website constitutes acceptance of its Terms of Service and Privacy Policy.

Warranty

- 3DP warrants that goods supplied pursuant to the sale order shall conform to the description therein stated and shall be free from defects in material or workmanship.
- This warranty shall be effective for a period of (90) days from the date of delivery of the goods to buyer.
- The warranty is based upon the printer being used under the normal conditions described in the documentation provided to you. Warranty covers replacement parts and not onsite service. This warranty excludes (i) normal consumable or expendable parts (such as nozzles), (ii) repairs or replacements during the warranty period because of abnormal use, misuse, neglect, or improper or unauthorized service.
- 3DP Unlimited offers extended warranty options. Please consult website or contact 3DP Unlimited at sales@3dpunlimited.com to explore what option is best suited for you.
- Seller disclaims all other warranties expressed or implied, oral or written, including, without limitation, the implied warranties of merchantability and fitness for a particular purpose.

Limitation of Liability

- Seller shall not be liable to buyer for any lost profits or other economic loss of buyer, or any direct, indirect, special, consequential, incidental or other similar damages arising out of any breach of this agreement by seller.
- Any obligations of seller pursuant to this agreement or the failure of the goods to perform in any particular manner.
- In no event shall the liability and/or obligations of 3DP Unlimited arising out of the purchase of equipment by you or others exceed the purchase price of the *3DP1000* 3D printer.

www.3dpunlimited.com

SERVICE & SUPPORT

Support	Visit the website for literature and video documentation to quickly answer common questions regarding your printer. www.3dpunlimited.com/support Email your technical question. Include images of the problem if necessary. support@3dpunlimited.com
Sales	sales@3dpunlimited.com
Marketing	marketing@3dpunlimited.com

Why **Play Around** with Ordinary **3D Printers?**

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Preliminary document, specifications and other information subject to change. 3DP-002 (r2) 12-2014